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24X Max CD-ROM
Compaq V.90 Data/Fax Modem[6]
Compaq PremierSound
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Pre-Failure Warranty:[7] Processor, Hard Drive
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Compaq 56K V.90 Modem:[6] $129

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Add 64 MB Memory: $229
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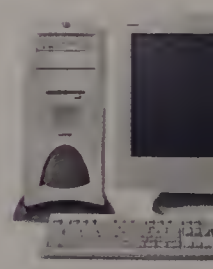

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- Compaq 56K V.90 PCI Modem[5]
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PC WORLD

APRIL

VOLUME 17 ◆ NUMBER 4

COVER STORIES

FIRST LOOK: PENTIUM III 500-MHz PCs

EXCLUSIVE Drumroll, please! The Next Big Chip from Intel has arrived. *PC World*'s hands-on tests of the first Pentium IIIs found plenty of reasons to lust after these brand-new powerhouses.

Plus a quick preview of the new K6-III CPU, AMD's answer to the Pentium III.

48 **Top of the News: Pentium III Hits 500 MHz!!!**

217 **Top 100: Pentium III: A Star Is Born**

217

FEATURES

106 **OFFICE 2000: WORTH THE BOTHER?**

PREVIEW Don't look for dramatic improvements from Microsoft's latest—just new Web and intranet tools, plus refinements in major apps. Office-suite jockeys may clamor for it, but casual users might do better to wait till the problems are ironed out.

127 **INTERNET EXPLORER 5: SEARCH AND EXPLORE**

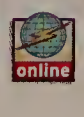
PREVIEW Credit the never-ending game of browser one-upmanship that Netscape and Microsoft play. For now, Goliath holds the better cards, as the new IE 5 trumps Netscape Communicator with smarter searching and accelerated browsing.

145 **CPU SCAMS**

CONSUMER ISSUES

Hardware thefts top a million dollars a day. Trafficking in counterfeit computer goods is more profitable than dealing drugs. Auction sites and small shops routinely offer PCs with doctored Intel chips. With so much "hot" hardware available, could your PC be carrying illegal components?

48



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162 **A SCANNER FOR ALL REASONS**

REVIEW These days, there's a good, affordable scanner waiting out there for every imaginable PC user—home, SOHO, and corporate. We test-drive 19 of them, priced from $99 to $699, to help you separate the diamonds from the zirconia.

SPECIAL REPORT

THE WEB AND YOU

193 **BROWSING FOR HOUSING**

Home, home on the Web—the Internet has become a great resource for house seekers. Step by step, here's how to sift through real estate listings, track down the best mortgage rates, and even find the best schools for your kids. Virtual realty was never like this!

COVER *Photography by Kevin Candland*

ICONS: JEFFREY PELO

TOP OF THE NEWS

48 PENTIUM III HITS 500 MHz!!!
The first 500-MHz Pentium III PCs run business apps about 10 percent faster than PII-450s do. And Intel claims that Web junkies, gamers, and multimedia mavens will love 'em. Now we just have to wait for the software. Plus an exclusive on the K6-III chip, the challenger from AMD.

56 INTEL PUTS BIG BROTHER INSIDE
By hardwiring unique serial numbers on Pentium IIIs, Intel hopes to enhance e-commerce security and prevent theft. But critics say the "super cookie" invades privacy.

60 WEB-BASED UTILITIES SPELL LOWER PRICES, EASIER UPGRADES
Say good-bye to shrink-wrap. More vendors are selling software on the Web, touting lower prices, better product support, and effortless upgrades.

64 WHO'S THE MASTER OF YOUR DOMAIN?
Since 1993, domain names came from a single source. Now other companies are readying to enter the registry business. Could this mean cheaper, more descriptive "dot.coms"?

NEW PRODUCTS

78 HP DeskJet 882C printer
79 Dell Latitude CPi A366XT notebook PC
80 WinBook XL 300 TFT laptop, ATI Rage Fury AGP graphics card
84 Microsoft Works Suite 99, Sierra Complete Publisher '99
88 NTI Backup Now, Iomega Clik storage drives
90 Jazba desktop publisher, WebRacer touchpad
92 Compaq TFT8000 LCD panel, SGI Digital Flat Panel Solution Pack; PageKeeper Pro 3.0 document manager
94 Simply Postage, Stamps.com
100 Cambridge Soundworks Model 88 table radio, Sony FVP-1 Mavica Photo Printer
102 SPOTLIGHT CTX Opto EZPro 585, InFocus LP400, Proxima UltraLight LS1, and Sony VPL-SC50U projectors

162

145

193

106

TOP 100

217 PENTIUM III: A STAR IS BORN
TOP 100 Six new Pentium III systems hit the market in style. But Pentium III isn't the only new chip on the block: PCs with Celeron-366 and AMD's K6-2-400 chips debut as well.

220 POWER DESKTOPS
TOP 20 Need the fastest Windows PC money can buy? 500-MHz PIIIs from Gateway and Dell are Best Buys, but Micron's Millennia 500 Max edges both with the first 6X DVD-ROM drive we've seen.

228 BUDGET DESKTOPS
TOP 20 Eight newcomers storm the chart, and the big news is what's inside: a mix of Celeron-366 and K6-2-400 chips battling Pentium IIs.

238 NOTEBOOKS
TOP 10 Led by models from Dell, Gateway, and NEC, laptops equipped with Intel's snazzy new mobile processors lay claim to nearly half the chart.

242 HOME PCs
TOP 10 The fastest home PC performance score we've seen carries Dell's $2449 Dimension XPS T500 to the number one position on the power chart.

245 COLOR PRINTERS
TOP 10 The Tektronix Phaser 740/N bests all corporate contenders thanks to brisk speed, good text quality, and a slew of office-oriented features.

251 17-INCH MONITORS
TOP 10 While new screens from Shamrock and NEC also make the chart, the $359 Optiquest V73 really caught our eye.

253 GRAPHICS BOARDS
TOP 10 Widespread price drops shake up the chart, as top performers from Creative Labs, Matrox, and STB all get tagged below $130.

255 MODEMS
TOP 10 How low can they go? Chartmaker NewCom's external modem sells for the unheard-of price of $76.

HERE'S HOW

260 WINDOWS TIPS
online Organize your Favorites menu, use keyboard "longcuts" to cut down on wrist-wrenching mouse activity.

264 WINDOWS NT
Secure Windows NT from snoops, create easy dial-up shortcuts.

268 ANSWER LINE
online Get rid of unneeded Windows files, print Quicken- or Money-compatible checks on the cheap.

272 INTERNET TIPS
online Defend yourself against nefarious Web applets, view any e-mail attachment with a single utility.

278 WORD PROCESSING
Save, print, and close with just one command, do your taxes in Word.

280 SPREADSHEETS
online Use a special add-in to fix potential year 2000 problems in Excel, combine text and values in a single cell.

282 HARDWARE TIPS
online Create an emergency "super" start-up disk, shut down your notebook properly before removing a PC Card.

286 UPGRADE GUIDE
Install a new graphics card, step by step.

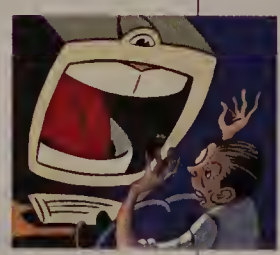
37

RESOURCES

14 HOW TO CONTACT PC WORLD
26 COMING UP
288 MAIL-ORDER SHOPPING GUIDE
294 PC WORLD MARKETPLACE
315 PRODUCT INFORMATION CARD
317 ADVERTISER INDEX
319 EDITORIAL PRODUCT INDEX

35

286


41

278

DEPARTMENTS

19 UP FRONT Keeping it simple and making it easy: Lessons from Apple Computer.

23 LETTERS Readers sound off on noisy PCs, the fair market value of legitimate software, and programs that bring IE with them.

29 CONSUMER WATCH Think you're surfing at 56 kbps? Bad phone lines and electronics can prevent it from happening.

35 ON YOUR SIDE Criminals commit fraud after signing on to America Online in *your* name. Can you protect yourself?

37 GOT A PROBLEM? So many peripherals, so few ports. If you face this quandary, we've got three letters for you: USB.

41 HOME OFFICE Practice sensible home ergonomics, advises Steve Bass, to keep your PC from killing you.

45 BUGS AND FIXES Sure as death: tax bugs in your software; hacking away at Office 97.
online

324 FULL DISCLOSURE The product name game: Are you ready to upgrade to version number 97546 1/3a Plus?

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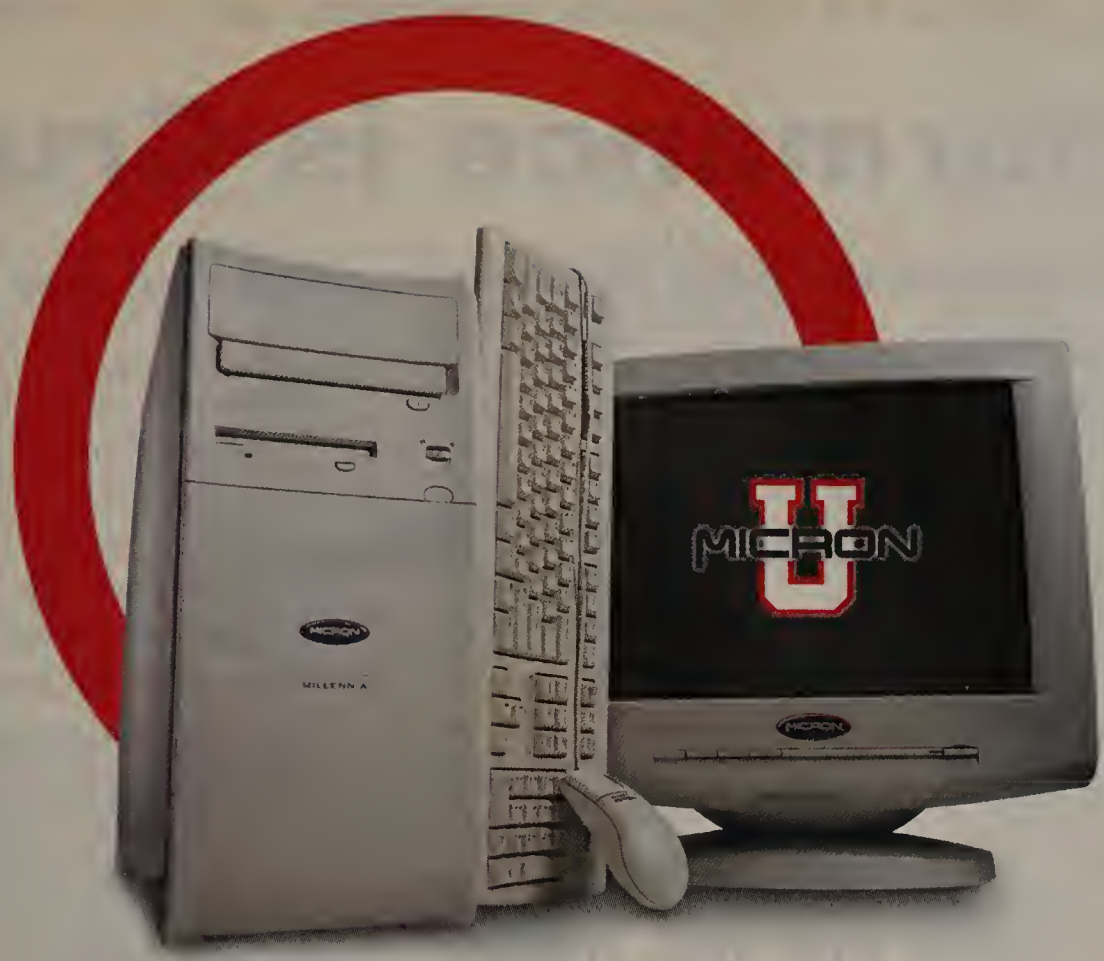

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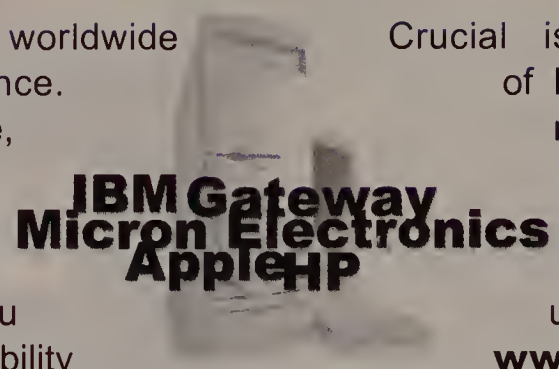

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The Challenge of the New Macs

INTEL AND MICROSOFT rake in mind-boggling profits, sit atop billions in cash, and invest big bucks in R&D. The companies' executives rack their brilliant, paranoid brains to produce visions of future computing. Between them, the two firms supply other PC giants with everything they need to flood the planet with powerful, inexpensive computers. Nothing can slow these vendors' surging sales except an occasional pause to curse the impossibility of differentiating products under the rule of the dynamic duopoly.

Then along comes Apple, a breathless shipwreck survivor crawling from a sea of red ink. It introduces first the iMac and now the new Power Macintosh G3 computer. Striking shapes and colorful polycarbonates distinguish these Macs from all previous computers.

The iMac and G3 are in some ways like the Mazda Miata. The Miata shares inner components with a much less successful Ford model, but a designer exterior made the Miata a sensation. Few can name the Ford equivalent.

The new translucent Macs have borrowed much from PCs: the Ultra ATA interface, PCI slots, PC100 SDRAM, and the Universal Serial Bus. The G3's built-in ATI Rage 128 graphics adapter was meant first and foremost for PCs. Some PCs and the G3 also have FireWire in common. To be sure, the G3 still has some components foreign to PCs, such as the PowerPC G3 processor and Mac operating system.

The new Macs will force the PC industry to focus as never before on designing more appealing PCs.

GOODIES FOR NOVICES AND POWER USERS

BUT THE NEW MACS differ from PCs in ways that go beyond cosmetics, the processor, and the operating system. For first-time buyers, the iMac's superior integration and ease of setup make it the most enticing computer ever. The G3 has the same distinction for users who have never met an upgrade they didn't like. The G3's side panel swings down, bringing the system board with it. Memory slots, PCI slots, and just about everything else are easily accessible. And each corner of the G3 has a handle for easy lugging. In short, the new Macs show that Apple has thought hard about the needs of two different kinds of computer users.

Though the new Macs could signal Apple's reemergence as a major competitor, that is not assured. Technical innovation in PC products keeps accelerating. Close on the heels of the Pentium III comes AMD's K7 chip with its 200-MHz bus, due in June. Then Intel will introduce AGP 4X and many other advances. Also due to arrive is a raft of new AGP graphics accelerators, including those from ATI, 3Dfx, Matrox, NEC, NVidia, and S3. Will these products be available for the G3's proprietary graphics connector? Similarly, will software developers devote more attention to the Mac when the vastly larger Windows market beckons and the Web is exploding?

Regardless, the appeal of the new Macs will force the personal computer industry to look up from its concentration on reducing costs, turning inventory, and slashing time to market. The new Macs demand a renewed focus on designing more appealing PCs.

TOWARD SIMPLER, SEXIER PCs

PCS MUST GET simpler, easier to use, and more attractive. As in all things PC related, Intel and Microsoft must lead the way. But they must do so not only by simplifying their own wares, but also by cutting their customers some slack. By stuffing more and more PC functions into its own chips or boards, Intel has left PC makers little to do but churn out beige boxes cheaper and faster. Intel must relax its stranglehold enough to let PC vendors design more distinctive, innovative products.

Microsoft has already paid lip service to the goal of simplification, but it will have to reinvent itself to deliver. Its approach to software design and its business model rely on making every promising new technology a standard part of Windows. That, in turn, gives Windows one byte of code for every particle in the universe. Is it any wonder Windows contains black holes and loose strings?

No one can encompass everything and keep it simple. Piling new "simplicity" features on top of all the others won't do the trick, not even when they're packaged as wizards and animated paper clips. Simplicity requires *leaving things out*. Yes, even some hot new technology that might make money for someone else! Simplifying Windows requires Microsoft to loosen its grip.

Failing to simplify the PC also has its costs. The Wintel formula of wrapping ever-increasing sameness around ever-increasing complexity is getting old. It hasn't produced a single distinctive model that sends people running to the showroom. Apple has two such models. The new Macs may not conquer the world, but they have made their point.

Phil Lemmons is editorial director of PC World. ■

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YOUR TAKE ON: Home networking ◆ Online brokers ◆ War on telemarketers

NETWORKING ON THE CHEAP

WHILE THE GENERAL information in the article "Home Networking Without the Network" [*Got a Problem?* February] was good, its premise—that "a two-PC setup can cost $200 to $300"—was way off. A major magazine ought to be more aware of current prices. Both Best Buy and CompUSA regularly sell a kit with two PCI network cards, a cable, and a hub for $50. Alternatively, you can piece the parts together for about the same price, since PCI ethernet cards regularly sell for $20 or less. This solution is less hassle, simple, and very cost effective—all the advantages suggested for Direct Cable Connection—and it is *much* faster.

Chad Bonnett, via the Internet

Editor's response: The $200-to-$300 price range that we mentioned is for products aimed specifically at home users who may not want to open their computer and install a network card. Also, some users lack the free slots or IRQs that ethernet cards require.

–Harry McCracken

ONLINE TRADERS–NOVICES BEWARE

AFTER READING "Trading Places: The Top Online Brokers" [February], I feel compelled to share a cautionary experience with other online investing novices. In brief, I placed a standing order with my online broker to sell shares when they hit my limit price, forgot about it—there was no reminder in the broker's interface—and later placed another limit order. The next day, *both* orders executed, creating what a customer service rep called an "illegal short position" because I sold shares of stock I didn't own. I had to make up those shares by buying back an equivalent amount at a much higher price. I've complained to the customer service department, but all the reps can tell me is that I "need to be more careful" and keep better track of my open orders. I'm out $700 and fuming.

Norman Hom
Sacramento, California

UNACCEPTABLY FICKLE PCs

LINCOLN SPECTOR'S January *Answer Line* Q&A item about reinstalling Windows 98 onto a reformatted hard drive speaks volumes about the state of the PC industry.

Spector writes, "Unfortunately, because every application messes up your system in its own special way, reinstalling Windows [either by deleting the Windows folder or by formatting the hard disk] is sometimes necessary."

All this is true, and Spector's how-to advice was no doubt correct. But in what other industry would this be acceptable? Can you imagine *Car and Driver* stating, "Since everything you do to your car messes it up in some indecipherable way, every so often you must disassemble your vehicle down to the nuts and bolts, or at least remove the drive train, and then reassemble it"?

D. Stephen Wallin, Kingman, Arizona

MICROSOFT FORCE-FEEDING

I PURCHASED Microsoft's Picture It 99 after reading favorable reviews of it in several computer magazines, including *PC World*, where it was a Best Buy in February [see "Picture Perfect"]. The installation CD absolutely refuses to install the photo editor unless you first install IE 4 (which is on the CD). In my case, Outlook Express was also installed, and IE 4 became the default browser, importing any Netscape bookmarks. This development ▶

HOT BUTTON

Noisy PCs: Louder, I Can't Hear You!

EDITORIAL DIRECTOR Phil Lemmons had it exactly right about the noisiness of new computers ["Needed in PCs: Less Noise," *Up Front*, February]. We just upgraded to a Hewlett-Packard NetServer E45 system. It's so noisy that it interferes with communications in the office. People on the other end of telephone conversations can hear the fan running. We are currently building a noise reduction housing around the case, and that should help.

Nick Ridgeway, Yorktown, Indiana

YOUR ARTICLE about PC noise was spot-on. However, I've been reading your magazine for years without seeing any stats or comparisons of PC noise. Such reports would be very helpful, since noise is difficult to compare from one store to another and impossible when buying direct.

I'm running a new laptop and a two-year-old desktop. The laptop has a CPU that's three times faster and a hard drive that's four times bigger than the desktop, yet the laptop makes hardly any noise, whereas the desktop is very noisy. Both are from the same company. If laptops can be relatively quiet, why can't desktops?

Robert C. Ladouceur
Louisville, Kentucky

PC WORLD COULD give consumers some auditory ammunition by testing all featured computers for noise level: Set a standard distance—perhaps head height, 2 feet away from the PC case—and report the readings of your decibel meter. Do something similar with fans and other noisy equipment, installed in a PC equipped to a standard of your choice.

Noise threatens everyone's hearing. Here's to increased awareness and action.

Susan Fowle, Hayward, California

Editor's response: We hear you. We are exploring the issues surrounding testing personal computers for noise. With hotter-running 500-MHz systems already available, fan noise (for example) may grow worse, not better.

–Tracey Capen, executive editor for reviews

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CORRECTIONS AND CLARIFICATIONS

FEBRUARY'S *Bugs and Fixes* ("Umax Scanner Driver: Death to Disks") contained erroneous information. The Microsoft Knowledgebase article it referred to does not state that a faulty Umax scanner driver randomly causes hard disk corruption, nor does it state that this problem occurs on 300-MHz or faster PCs. Further, the reported Umax driver update is not designed to prevent hard disk corruption.

In fact, the Umax driver patch described in the Microsoft article solves a less serious problem that can prevent Windows 95 from booting correctly. This problem occurs in Windows 95 and 98 with versions 2.45 and earlier of Umax's VistaScan software. The software was bundled with Umax Astra and Vista scanners. When installed, the problematic device driver (umaxis11.386) prevents Windows from loading the key system file vmm32.vxd. Windows then halts the boot process and displays a message that vmm32.vxd is missing or damaged. Described in TechNote 7076 on Umax's Web site, the patch is available at www.umax.com/graphsite/umaxen/support/download/scanners.cfm and in the Microsoft Knowledgebase article at support.microsoft.com/support/kb/articles/q191/8/74.asp.

In March's *Top 10 Monitors*, the contact phone number for the Sampo unit should have been listed as 877/467-2676.

February's "Picture Perfect" evaluated MGI's PhotoSuite II photo-editing package, not PhotoSuite 8.0 as listed.

The February *New Products* review of QuickBooks Pro 99 should have said that the upgrade rebate for owners of the QuickBooks Pro 6.0 five-user pack is $160.

In February's "Your PC in the New Millennium," the sidebar "CPU Road Map" misstated the line width of the forthcoming Intel chip that is code-named Coppermine. The width will be 0.18 micron.

PC World regrets the errors.

is not mentioned in your review or any other I've seen, nor is it mentioned anyplace on the box. I cannot imagine why your reviewer did not see fit to mention this force-feeding, and I am rapidly ▶

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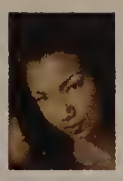
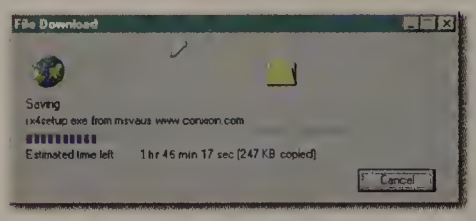


"I Knew There Was a Better Way!"

Madison Scott: A Real User's Experience



Old Way

1. Needed to upgrade software, headed for the Internet. Found application was 8 megabytes requiring 1 hour and 45 minutes to Download.
2. Realized my time was more valuable and decided I didn't want the software that badly!

PC World CD Way

1. Received the April PC World CD and Found
   - The Complete IE 4.0 program (over 50 megabytes)
   - The New WorldPerfect Office 2000 Suite Beta (The whole thing!)
   - Over 40 Great Shareware programs from PC World Online's FileWorld
   - The Symantec Giveaway offering 15 New Winners Every Week
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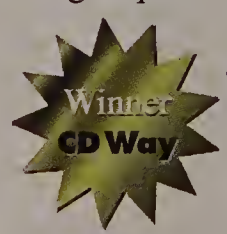
3. No Downloading required!



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becoming a fan of the Justice Department in its battle with Microsoft. I changed the default browser back to what I wanted but now have IE, Outlook Express, and who knows what else taking up room on my system. If I uninstall them, will Picture It continue to work? Who knows? Should I waste time finding out? Revolting!

Walter Knoth
Mendenhall, Pennsylvania

Editor's response: True, we probably should have noted this requirement of the software. However, the installation of Outlook Express and the importation of bookmarks are both options. You can uninstall IE 4 and Outlook Express, and Picture It will continue to work.

—Andrew Brandt

WHAT TECH SUPPORT?

IN FEBRUARY'S *PC World*, a letter from Michael Evans, commenting on December's "Is Your Software Stolen?" states: "People have concluded that the 'fair market value' of legitimate software isn't fair."

Evans attributes this situation to the bugginess of software. But there is also another reason: the abandonment of free, knowledgeable tech support by software manufacturers. Nowadays, technical support often is not free, not timely, and lacking in both understanding of a problem and its solution.

My policy these days is that if I can't install a program and get it working within about 15 minutes, I uninstall it and return it for a refund. Period.

Donald Morgan
Bellingham, Washington

ZAPPING TELEMARKETERS

THANKS TO Steve Bass's article on the Enigma utility ["I Declare War on Telemarketers," *Home Office*, February], the only thing enigmatic about the telephone solicitations I get these days is the stammering from very puzzled callers. Apparently they don't have a lot of folks asking for *their* name/rank/service number and quoting them the law.

Phil Evans, via the Internet

PC World *welcomes your responses, ideas, and other letters to the editor.* *See page 14 for contact information.* ■

COMING UP IN MAY

ALL WINDOWS, ALL THE TIME

Working with Windows 95 or 98? We collect the top tweaks to turbocharge both operating systems. Start by customizing menus and folders, fine-tuning hardware, and salvaging disk space.

PC RELIABILITY AND SERVICE

Thousands of readers contribute to *PC World's* latest comprehensive report on the best and worst PC manufacturers. Which ones are worth your money when buying a business, home, or notebook computer?

19-INCH MONITORS

Flat glass screens, shorter picture tubes, and slashed prices—you couldn't pick a better time to buy a 19-incher. We also try some budget-priced 21-inch contenders for comparison.

ULTRAPORTABLE PCs

The latest superlight notebooks and Windows CE devices can be seductive. But buyer beware: Many models involve compromises. We check top choices.

SELLING ON THE WEB

Want to hawk your goods online? Learn from thriving small businesses about the fastest, cheapest, and easiest ways to sell successfully on the Web.

ALSO NEXT MONTH

▶**The PC World Top 100:** The Top Power and Budget Desktops, Notebooks, Home PCs, Printers, Monitors, Graphics Boards, and Modems.

▶**Here's How:** Windows Tips on accessing recent files faster, Internet Tips on managing all your Web site passwords, Upgrade Guide on installing an EIDE hard drive.

PC WORLD

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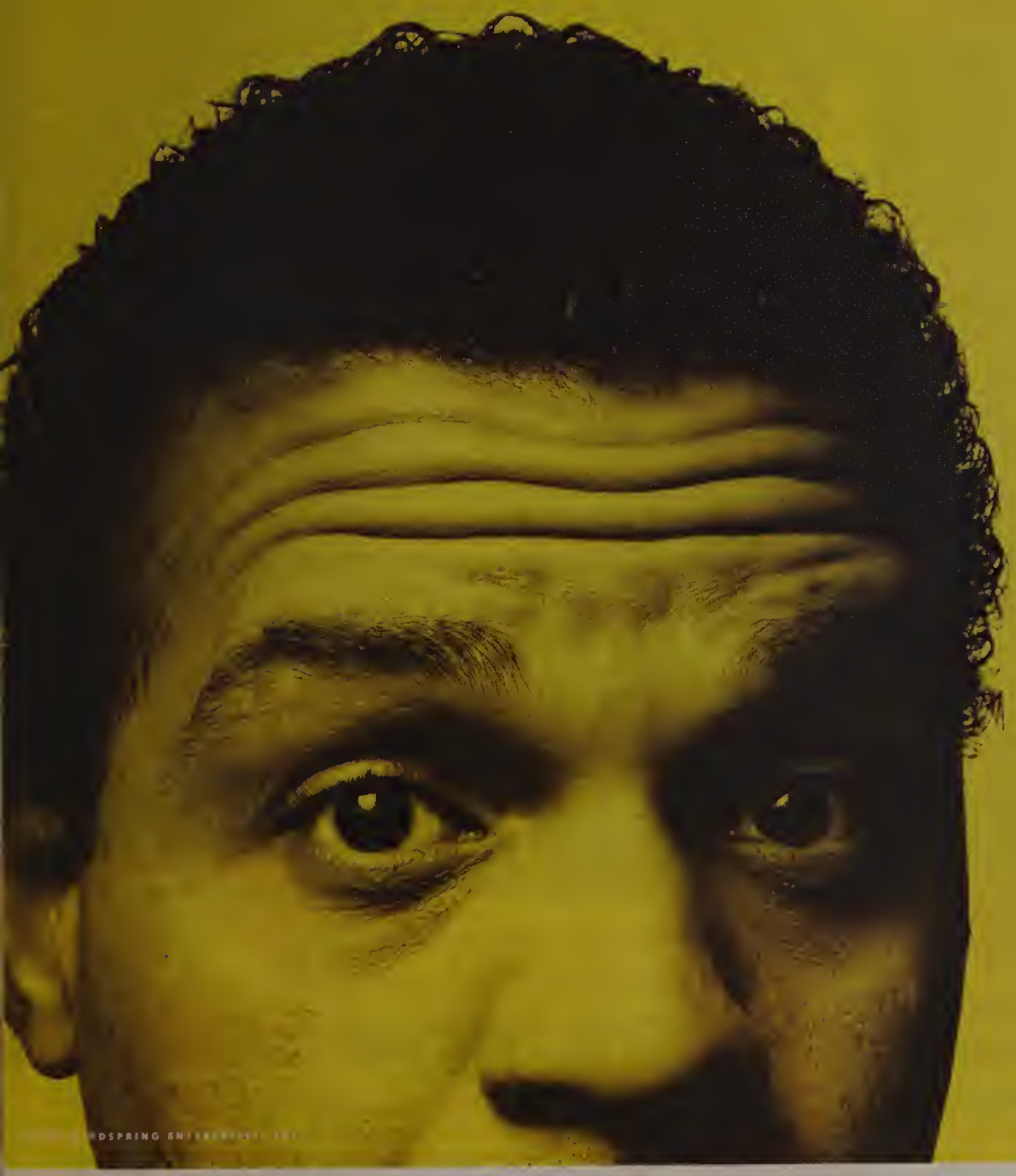

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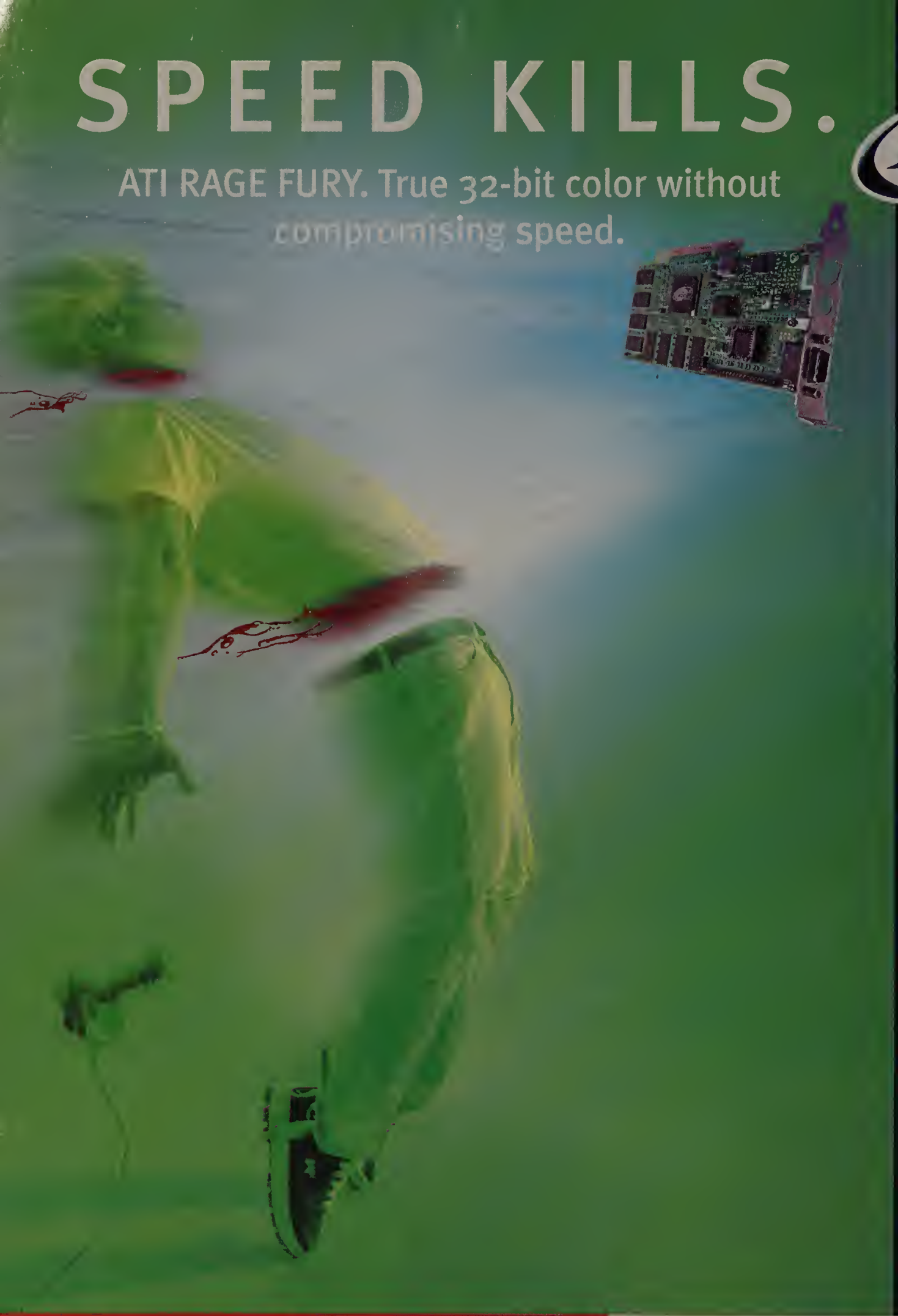

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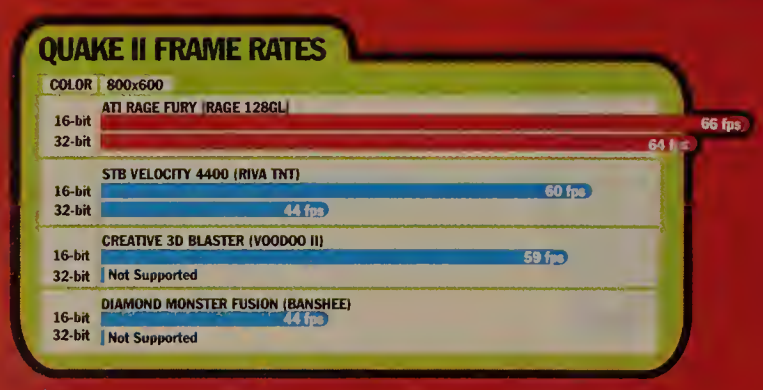

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Dreaming of True 56-kbps Access?

Defective phone lines and cheap electronics are just two of the forces conspiring against consumers.

ILLUSTRATION: ADAM MCCAULEY

MOST OF THE NEWS is good for users of 56-kbps modems. After much wrangling, the industry has agreed on a single standard for high-speed access. The Federal Communications Commission is talking about lifting its long-standing cap on data transmission speeds—roughly 53 kbps since the mid-seventies—removing an artificial barrier on access for the few who can connect at top speed. And after a slow start, ISPs are rapidly implementing V.90 in all their points of presence, the phone numbers you use for dial-up access. Add the fact that most V.90 modems cost under $100, and it's hard to imagine why anyone wouldn't jump-start their link to the Net.

But buying a new modem and cruising the Net at 56 kbps are two different matters. Experts agree that 56-kbps modems work pretty well—in an ideal world. But in the real world, any number of factors—from poor V.90 implementation to faulty electronics and shoddy ISP practices—can sabotage your chances of obtaining a dependable high-speed connection.

The industry has been "a bit disingenuous about what the average person could see with 56K," says John Navas, principal of The Navas Group, a high-tech consulting firm in Dublin, California. Navas, who's spent many hours testing 56-kbps modems, searching for the cause of slow access speeds, predicts that up to 40 percent of Web-goers will never achieve anything close to 56-kbps access. (Modem makers put that proportion closer to 15 or 20 percent.)

SORTING THROUGH THE STANDARDS

SOME OF THE initial hassles of 56-kbps access concerned the two competing standards, x2 and K56flex. You'd think ratification of the V.90 standard would have eliminated those problems. But agreeing on specs is one thing; implementing them is another.

"V.90 is not as ready as some people would like to believe," says Erikas Napjus, project manager for Inverse Network Technology, the Sunnyvale, California, leader in ISP performance testing. In tests of V.90-compatible modems last winter, Napjus's staff found problems with every one they tested. Some models had exceptionally high failure rates when measured against ISPs whose modems operated from another chip set. Napjus attributes this problem to incompatibilities between different chip set manufacturers' implementation of V.90.

"One vendor issues a bug fix to correct a problem with its modem, and it winds up causing a new problem with another company's product," says Napjus. The result can be anything from a slow connection to no connection at all.

In testing V.90 modems for our January review ("V.90 Modems: The End of the Line," www.pcworld.com/jan99/modems), *PC World* encountered similar problems between modems with once-competing chip sets. Matching a user's x2 modem with an ISP's x2 modem (or, likewise, K56flex with K56flex) boosted performance by up to 23 percent. So you might be better off sticking with your x2 or K56flex modem if your ISP supports that standard.

Although these examples paint a bleak ▶

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picture of the future of universal compatibility, Napjus says many of V.90's problems are temporary, and updates will be complete by spring. And then we'll all be humming along at 56 kbps, right? Wrong.

REAL-WORLD LIMITATIONS

COMPLETE AND UNIFORM implementation of the V.90 standard will solve some of the problems consumers encounter with high-speed connections. But it won't guarantee faster access for everyone who upgrades. Why not? Let's start with the indoor culprits, then work our way out.

Appliance overload. Too many devices on a single phone line—or inferior ones—can slow access speed. Most experts agree that you shouldn't have more than four devices on one line. And if you're using low-quality equipment, like a cheap phone or fax machine, as few as two devices on a single line can cause problems. "These devices continue to draw power from the line, even when they're not in use," says Navas. The cheaper the device, the more likely it is to steal power from the line.

Fortunately, it's easy to find out whether excess baggage is the cause of a slow connection. Perform this test: Log on to your ISP several times in one day, noting your connect rate each time. The next day, disconnect everything but your modem and log on at roughly the same times. If you see faster rates on the second day, you've probably identified appliance overload as at least one cause of poor performance.

Consider devoting a single line to Internet access. Alternatively, invest about $15 in a line protector, a device about the size of a 9-volt battery that plugs into your phone jack and cuts off any connected phones or fax machines whenever you're online. It may not solve all your problems, but it's worth a try.

Wiring woes. You may also have to look at the line itself. First, find out if you have a noisy line (typically the result of older or substandard wiring inside your home). Phone someone and ask them to put you on hold. If you hear a hum or other feedback, chances are you have inferior wiring. Although this problem isn't as easily corrected as appliance overload, it's worth calling your phone company to see if it can fix your wiring. A word of caution: Most phone companies charge by the hour to repair inside wiring. Don't request a technician unless you have a wiring service plan that entitles you to free repairs.

Another source of wiring problems, according to Navas, stems from phone companies' use of subscriber line concentrators called *multiplexers*. Multiplexers are often used in areas experiencing rapid population growth and thus a high demand for new phone lines. Rather than running a new line for every new connection, phone companies often piggyback many connections on a single line. As long as the connection is direct to the main digital switch, multiplexing needn't degrade performance. But certain types of multiplexers require a digital-to-analog conversion between your home or ▶

56-KBPS ACCESS?

THINKING ABOUT upgrading to V.90? Having problems with an existing V.90 connection? Here's what you can do to maximize performance:

- Dedicate a phone line to your Internet connection or buy a line protector to minimize interference.
- Test your maximum line speed using U.S. Robotics' Line Test utility (www.3com.com/56k/need4_56k/linetest.html).
- Check with your modem manufacturer to make sure you have the latest firmware (the software that controls your modem's functions).
- Make sure your ISP has a V.90 line. Don't upgrade your connection to V.90 until your ISP upgrades—you won't get faster access, and you could wreak havoc with your connection.
- Ask your ISP what chip set it uses in the modems at its facilities. Consider sticking with x2 or K56flex if your ISP supports it. Buying a desktop modem that uses the same chip set will reduce the likelihood of incompatibilities and may boost performance.
- Read up on the new technology. A good place to start is www.56k.com; the site has a detailed section of frequently asked questions about the technology, plus links to modem manufacturer sites.

Power On.

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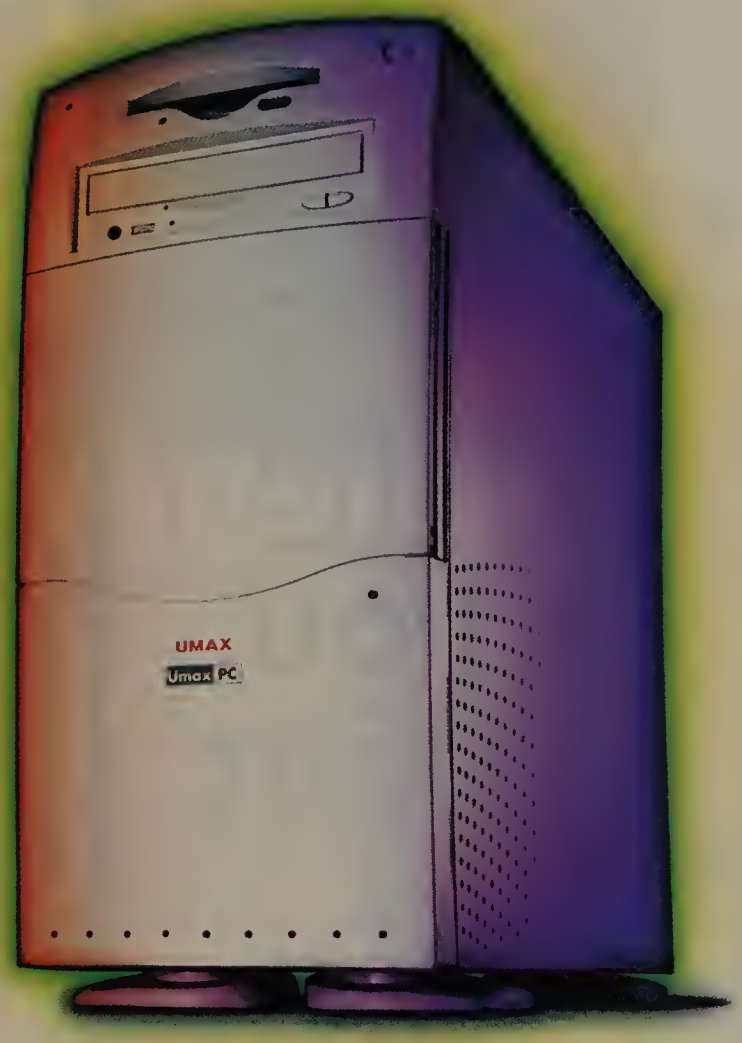

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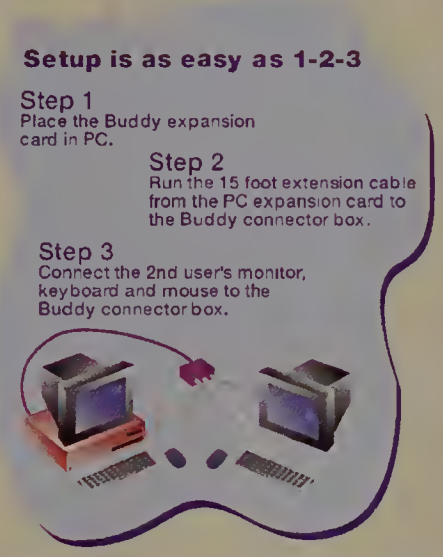

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office and the central switching office. In such cases you have no chance of a rate higher than 33.6 kbps. And just as you can't do much about a multiplexed line, you can forget about high-speed access if your home or office is more than about 3.5 miles from the phone company's central switching office.

ISP practices. The efficiency of the ISP also affects connect rates substantially. Since some ISPs contract with alternative carriers to reroute calls, you may be connecting to the Web via a site many miles away, an arrangement that typically results in a poorer connection. Performance will also be hampered if your ISP routes calls through what Navas calls "choke points"—much-used hubs that inevitably bog down during peak times.

If your ISP rep doesn't want to answer questions about these practices, you can test your ISP yourself. Windows has a utility called TracerT that will identify the route by which you're connected to the Web. Dial in to a few sites and check the location of the first connection using TracerT. If it's not the city where your POP is located, call your ISP.

Beyond tracing your route to the Web, take advantage of a free trial offer from an ISP and compare its performance with that of your current provider (see our March review "Good Providers: The Best National and Regional ISPs" at www.pcworld.com/mar99/isps). If you consistently see better performance with a different ISP, it's time for a change.

TIME TO UPGRADE?

GIVEN ALL THE potential problems, don't expect your new V.90 modem to double your access speed. Some consumers won't see any increase until they switch over to cable, ISDN, or a digital subscriber line. But a little sleuthing may uncover the information you need to take advantage of a fast modem and move out of the slow lane for good.

PC World *Contributing Editor Roberta Furger is the author of* Does Jane Compute? Preserving Our Daughters' Place in the Cyber Revolution *(Warner Books, 1998).* *See page 14 for contact information.* ■

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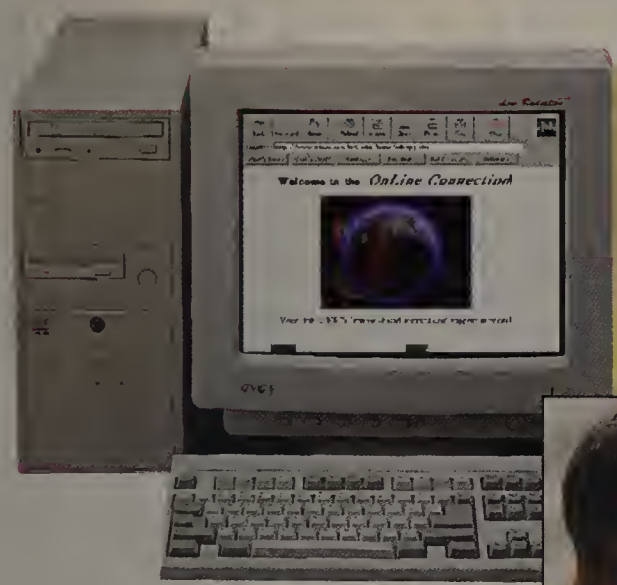

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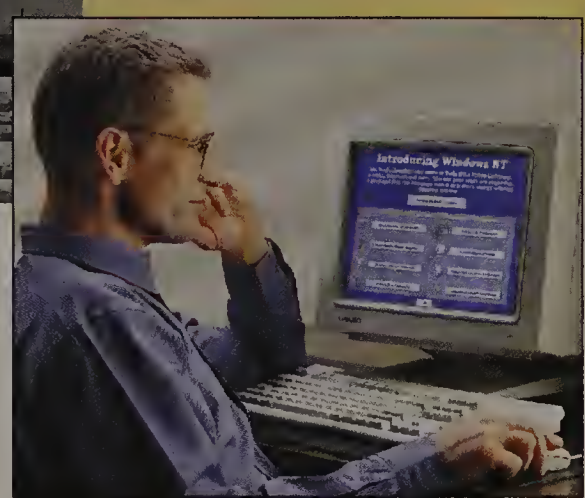

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Robbed Online—AOL Was the Weapon

"I WAS A FRAUD VICTIM, in which America Online was the instrument used," writes Scott McBurney, a software engineer in Elwood, Illinois. "A supposed friend opened an account in my name, ordered over $2000 worth of goods, and billed them to my checking account."

McBurney discovered disturbing things after his ordeal: You can register with AOL using a checking account number—and without written identification. You can buy goods online and bill them to an AOL account. AOL doesn't have to refund money lost due to third-party fraud. (The company can't discuss his case for privacy reasons.) Lastly, unlike with credit card fraud, banks won't cover losses from checking account scams.

AOL did refund the fees it charged McBurney while his "friend" posed as him online—but he must recoup shopping charges through law enforcement. (McBurney's local police are investigating.) The company confirmed that it does not require written ID from anyone attempting to register with a checking account number, but it insists that its verification procedures are stringent.

To me, it sounds too simple: Call AOL, give the rep your info, and someone will call back to verify. (It's unclear if this happened in McBurney's case.) AOL confirmed that goods can be billed to your account if you buy using AOL's "pop-up" marketing messages. (Other Web merchants require a credit card and handle their own billing.) AOL's Wendy Goldberg says that the identity fraud McBurney experienced is rare. More commonly, a crook gains the password to an existing account. She urges you to check for unusual online activity. If you log on and are told that you're already on, or if you receive replies to e-mail you didn't send, notify AOL. And guard personal information around others. In the online world, a crook can do lots of damage in your name.

Heads Up...

I WAS INUNDATED with letters about utilities maker **Network Associates** in the wake of its acquisition of Cybermedia and Dr Solomon's—mostly about lousy tech support. John Staudenraus, a Network Associates spokesperson, admits that fast growth led to overloads in late 1998 for the servers the company's help staff relies on. Response time should be noticeably better now... Maybe this is **where your rebate went?** Tom Bovis of Houston writes with a delightful twist on rebates. He got two checks from hard disk manufacturer Maxtor for one purchase and alerted the company to the mistake. Maxtor replied with a canned message from its rebate processor. Then the company sent multiple $30 checks—16 in all (totaling $480) for his $209 hard drive. Bovis sent most of them back—but Maxtor let him keep a few... Several people complained about a **Tiger Direct** ad in January's *PC World*. When readers ordered the advertised memory, the price had doubled. Spokesperson Richard Wallet told me the firm was surprised by a memory price jump and had omitted its "prices subject to change" disclaimer. The problem was fixed in February. Readers who wrote to *On Your Side* were given an "unadvertised special."

LETTER OF THE MONTH

I AM DISAPPOINTED with 3Com's U.S. Robotics 56K Voice Faxmodem Pro and with the company's response to my pleas for help. I paid $200 for the modem because the company promised a "limited lifetime warranty." But nothing in the warranty states that I have to use the modem in the U.S. I can't find a statement in the documentation or on the box that says the modem is geographically limited. But it does say "world," "worldwide," "international," or "global" 12 times on the box.

—*Gordon Prouty, Cairo, Egypt*

***PC World* responds:** A 3Com spokesperson explained that desktop modems rely on the user's local power and phone configuration and so are geography-specific. The representative suggests that customers consider this fact before taking an external modem overseas, just as they would with other electrical devices such as hair dryers. The company is considering adding information to the packaging to make explicit the geographic location the modem is made for. In the meantime, 3Com has sent Prouty a free power supply that solved his problems. ■

GOTTEN A RAW DEAL?

Or a great one? E-mail us the details at onyourside@pcworld.com. We will investigate complaints and publish items of the broadest interest. Christina Wood is a contributing editor for PC World.

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So Many Peripherals, So Few Ports

PROBLEM *You've collected more serial and/or parallel port devices than your PC can handle.*

SOLUTION *Use a converter kit to connect the devices via a Universal Serial Bus port.*

PHOTOGRAPH: BILL CRAMER

FOR TWO YEARS, Mike LaGamba faced an exasperating and all too common problem: His PC, with its single parallel port and two serial ports, didn't have enough connectors for all the peripherals he wanted to use. The registered nurse from Mount Laurel, New Jersey, bought hardware switches and installed a parallel port card, but he still couldn't connect his laser printer, color ink jet printer, and video camera simultaneously.

"I had a drawer filled with gadgets for which I spent well over three or four hundred dollars," LaGamba recalls ruefully. "The switches allowed only one printer at a time to print. The parallel port card would have forced me to rearrange my entire hardware architecture just to free up one IRQ. I didn't even bother trying my camera's pass-through parallel port connector because I'd heard they're so flaky."

LaGamba figured he was out of luck but doggedly kept checking his local CompUSA store for a product that might help. Finally, he found an unexpected solution: Universal Serial Bus converter kits that let him connect all his peripherals quickly, reliably, and simultaneously.

PUT USB TO WORK

IF YOU BOUGHT your PC in the past couple of years, it probably has at least one USB port. And once-scarce USB peripherals are finally hitting stores in significant numbers. Still, it'll take years for most people to replace all their old peripherals with USB versions, despite the technology's promise of Plug-and-Play hookup of up to 127 devices via a single port. In the meantime, USB ports collect dust on many machines, and many users face LaGamba's dilemma: lots of equipment to connect and no simple, effective strategy for sharing or adding ports.

Enter USB converter kits—products that let you plug parallel and serial port devices, such as printers, modems, and cameras, into USB ports. Sold by companies such as Belkin Components and Entrega Technologies, these products have their limitations: Most notably, they can't handle any parallel devices except printers. But they can provide an easy alternative to futzing with parallel port pass-throughs or IRQ-hungry serial/parallel add-in cards.

If your PC has one or more USB ports (small, rectangular jacks situated near the system's other ports), you simply use the kit's special converter cable to connect a non-USB peripheral. If you have an older machine (like LaGamba's Pentium-166) with no USB ports, you must buy a USB adapter card (for about $40 to $70) and install it in an empty PCI slot in your PC. But it's a no-brainer after that. Just plug the converter cable into one of the card's external USB ports, and you're ready to hook up a non-USB device.

Products like Entrega's $49 USB-to-parallel kit (which LaGamba uses) or its $79 USB-to-serial kit will free up one port. If you need to add lots of devices, you may be best off with a USB *hub* that conveniently clusters multiple parallel, serial, USB, and even ethernet ports in one unit; these typically cost from $150 to $200. ▶

ZIP DRIVES NEED NOT APPLY

IF YOU WANT to add a modem, digital camera, or other serial port device, a USB converter kit may be just the ticket: It'll work with any serial port peripheral. But as mentioned earlier, printers are currently the only parallel port peripherals you can convert for use with USB. Parallel devices such as Zip drives, tape backups, and scanners aren't compatible. David Murray, vice president of marketing for Entrega, attributes this complication to the wide range of connection protocols such devices use. You can avoid an impasse by relocating your printer to a USB port; your standard parallel port will then be free to accept other parallel devices.

USB works best with Windows 98, so if you've been on the fence about upgrading, now may be the time. With Windows 95, only the OSR 2.1 and 2.5 versions support USB, and some USB devices don't work at all. For the moment, Windows NT users are out of luck: NT doesn't support USB—period. (The oft-delayed Windows 2000 promises to remedy that deficiency.)

USB PCI adapter card, USB-to-parallel printer kit, USB-to-serial converter kit

Street price: two-port card, $40; printer kit, $60; serial converter kit, $90; Belkin Components; 800/223-5546; www.belkin.com

PRODUCT INFO NO. 606

USB PCI adapter card, USB-to-parallel printer kit, USB-to-serial converter kit

Street price: two-port card, $39; four-port card, $69; printer kit, $49; serial converter kit, $79; Entrega Technologies; 949/859-8866; www.entrega.com

PRODUCT INFO NO. 607

Still, using USB to extend the life of non-USB add-ons—and give yourself some extra ports in the bargain—makes a lot of sense. Although costs can mount if you need to buy multiple converter kits, the converters install and work much more smoothly than other solutions, according to LaGamba. The kits also should prove a boon to notebook users, who have fewer expansion options than desktop PC owners (most new notebooks include one or two USB ports).

To LaGamba, who no longer has to swap cables or maintain two PCs just to handle his add-ons, the kits are a minor miracle. "I'm a cynic," he claims. "I had every resource book and manual out, ready to go tooth and nail with these things. But in 10 minutes and for a minimum outlay of money, I solved all my problems. I was printing different jobs to each of the printers and videoconferencing with my friends—from one PC, all at once."

Carla Thornton is a contributing editor for PC World. *If you're having trouble resolving a PC-related hardware or software problem, we'd like to hear from you. See page 14 for contact information.* ■

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How to Keep Your PC From Killing You

EIGHT YEARS AGO I was a mess. I was spending so much time at the computer, my vision was blurry, my hand ached (a disorder sometimes known as *mousinitus)* and my neck and shoulder hurt from scrunching the phone while typing.

ILLUSTRATION: MARK MATCHO

I watched an employee developing a bad case of RSI (and probably a big lawsuit) right in front of my eyes.

Today, I'm armed with tools that reduce my repetitive-strain aches and pains. It may be time for you to take stock of your office—chairs, desk, keyboards—and make changes. My recommendations:

The right glasses: A computer screen is really just a bunch of fuzzy dots of light—bright at the center and dim at the edges. Your eyes can't get a handle on them, so they're constantly refocusing and readjusting. Prio Computer Eyewear helps you focus on the monitor.

To prescribe Prio glasses, an optometrist tests your eyes on an FDA-approved instrument that simulates a small computer screen. The Prios work even if you wear contact lenses or no glasses at all. They're not cheap—mine cost $140—but they're worth it. With my Prios, images are distinctly sharper, my eyes don't get tired, and I think I write better. Seriously, I won't use the computer without them. Period.

Rubber band: My user group recently had as a speaker Rich "Doc" Colley, a licensed chiropractor turned PC consultant. He recommended a cheap, ingeniously low-tech tool for reducing repetitive strain injury: a rubber band around your fingers. Colley told us that "RSI usually results from a constant, single plane of motion of one muscle group. The rubber-band exercise uses the protagonist-antagonist theory of muscle operation. If you type all day, the flexors of the wrist and fingers are stressed, and the joints become one-sided. Exercising the antagonistic muscle aids in balancing out the harm that's done at the computer."

So instead of clenching your fist, wrap the rubber band around the hand you use the most and extend it with your fingers. The exercise works, folks, I do it regularly.

Keyboard tray: At a friend's office recently I watched an employee developing a bad case of RSI (and probably a big lawsuit) right in front of my eyes. Her keyboard and mouse were on the desk and she was typing with her wrists bent upward. It hurt just watching her.

If you want to avoid RSI, you *must* keep your wrists straight and parallel to the floor. The best way is to stick the keyboard on a tray that slides under the desk.

I use Kensington's Underdesk SuperShelf. The 26-inch Kensington is rugged, big enough for my oversize Northgate keyboard, and has a mousing area attached. It's cheap, too, at $22 discounted. Installation is a hassle, but you can avoid it with Kensington's $60 EasyMount Underdesk that clamps on in seconds.

Telephone headset: A headset keeps my head upright and my hands on the keyboard. The gizmo plugs into my single-line telephone, substituting for the handset. Plantronics headsets are cheap—I saw one at an office supply store that was going for about $80.

A comfy chair: I've got my tush comfortably planted in a marvelously designed office chair from BodyBilt. The backrest is fully adjustable, there's an inflatable lumbar support, and the seat keeps my legs parallel to the ground. The seat's contouring and size disperses my weight evenly, reducing pressure on my thighs.

The chair's three levers let me adjust the height, tilt the seat, and change the backrest angle to keep the center of the monitor at the recommended 20 degrees below eye level and my feet flat on the floor.

The cheapest one is $600. Add a 360-degree linear tracking arm to support your forearm or opt for leather, and the cost skyrockets to $1200. Hey, it's your tush.

Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. *See page 14 for contact information.* ■

BodyBilt Task Series chairs
List price $600 to $1200, depending on model; BodyBilt; 800/364-5673; www.bodybilt.com
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PLX-500 Headset
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PRODUCT INFO NO. 689

Prio Computer Eyewear
Street price $140 to $200; Prio; 800/621-1098; www.prio.com
PRODUCT INFO NO. 690

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Late tax fixes ◆ More Office 97 insecurity ◆ Quicken 99 chokes again

Don't Let Bugs Muddle Your Taxes

IF YOU USE TAX SOFTWARE, it's a good idea to check the software maker's Web site for last-minute fixes before you send in your return. Doing this usually takes only a few minutes and shouldn't eat into your customary April 15 late-night vigil. Updates often occur in response to the latest IRS changes; outright bugs that affect a large number of filers are rare. But Murphy's Law goes double where the IRS is concerned.

No major new tax programs have arrived since last year. The two perennial leaders endure: Intuit's TurboTax family and Block Financial's Kiplinger TaxCut. As of late January, both companies had listed numerous problems with their programs, along with fixes. By the time you read this, each may have released additional updates, so be sure to check the software maker's Web site before you sign by the X.

At press time, Intuit listed 25 TurboTax problems, including incorrect 1999 estimated tax and W-4 calculations and incorrect 1999 taxable income projections. Intuit's Web site (www.intuit.com/support/turbotax/updates/1998/win/turbotax.html) offers detailed descriptions of the problems. To update your copy of TurboTax, choose *Help•One-click Updates* in the program.

TaxCut seems comparatively bug-free, with only ten problems reported as of this writing. These include a dependent-care credit error on Form 1040A, Earned Income Credit miscalculations, and file backup errors. Read the details at www.taxcut.com/updates/98fedwininstruct.html. To update your copy of TaxCut, go to *Tools•Update TaxCut*. Don't bother with the Update TaxCut shortcut in the Start menu's TaxCut 1998 menu because—yup—it's buggy.

Quicken 99 Problems Persist

THE SAGA OF Quicken 99 continues. January's column reported numerous bugs in Intuit's flagship personal finance program. To combat the infestations that it recognized early on, the company posted a Quicken 99 Release 2 (R2) update (reported in last month's column), but the bugs don't stop there. If you enter any transactions during this calendar year under the 'Auto expense' category and then access one of the program's financial centers that reference the Auto category, Quicken crashes with a divide-by-zero error. As we went to press, Intuit posted Release 3 (R3) to fix this problem along with a few others. To download the patch, go to www.intuit.com/support/quicken/index/ndxw_8_updates_html.

IN BRIEF

Timeslips Away

IF YOU UPGRADED to version 9 of the venerable Timeslips billing software in the past six months, you've probably had more than your share of aggravation with Sage U.S.'s buggy program. Since Timeslips version 9 shipped last November, Sage has had to post four separate (and massive) Timeslips service releases, the most recent of which rumbled onto hard drives at a jumbo size of over 13MB. That's probably what prompted Sage vice president Matthew Lafata to post a near-abject apology on the company's site at www.timeslips.com/mattletr.htm. According to Lafata's mea culpa, Sage planned to post yet another update in early February and mail it to registered users on CD-ROM. You'll find the Timeslips update located at www.timeslips.com/down32.htm.

Office 97 Still Hackable

LAST MONTH, I reported on a security hole in Excel that could allow malicious hackers to read or destroy your files. Now Microsoft has announced—and filled—two more holes in Office 97.

The first is a gap in Word's macro execution security. Normally, when you open a Word document that contains macros, the program warns you of their presence and gives you the option of disabling the macros. Unfortunately, if the document contains no macros but is linked to a template file that does, Word simply skips the warning and runs the template file's macros willy-nilly. Someone who wants to exploit this lapse could create nasty files, links, and macros and attach them to an e-mail message or Web page (something Microsoft says no one has done yet). To protect your system, download and install the 96KB Word 97 Template Security Patch from officeupdate.microsoft.com/downloaddetails/wd97sp.htm.

A second security hole seems less critical. Office 97 and several other Microsoft applications come with an ActiveX control called Forms 2.0 Control that lets you create custom dialog boxes in your applications. Due to a flaw, the control also allows hackers to read the contents of your Windows Clipboard. You can download a 658KB patch at officeupdate.microsoft.com/downloaddetails/fm2paste.htm.

You can find files mentioned in this article on PC World Online at www.fileworld.com/magazine. Scott Spanbauer is a contributing editor for PC World. ■

BUGGED?

FOUND A HARDWARE or software bug? Tell us about it via e-mail at bugs@pcworld.com.

ICON: JEFFREY PELO

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TOP OF THE NEWS

Pentium III Hits 500 MHz!!!

Pentium III PCs run at dizzying speeds. They promise to accelerate Web apps, simplify voice recognition programs, and liven up games. But it's up to software makers **to deliver the goods.**

◆ **By Scott Spanbauer**

Intel Pentium III

YOU MIGHT think Intel just released the Pentium III. But take a close look at the label and you'll see that it's actually the Pentium !!!

Microprocessors rarely inspire sentiments commensurate with three exclamation points. Does this long-awaited top-of-the-line chip live up to its breathless billing?

Systems based on the PIII-500 gush speed, outrunning all other Windows 98 desktop machines we've tested. But the new chip offers more than the next step on the megahertz staircase. Intel has also given the PIII a total of 70 new processor instructions designed to accelerate specially written games, Internet plug-ins, graphics, and speech recognition applications. Our preliminary tests show that this technology may add real muscle to those tasks. And this doesn't look to be a reprise of the 1997 Pentium MMX launch—this time, more software will be available that actually uses the new capabilities. Much of that software, at least initially, will cater more to gamers and multimedia mavens than to serious business users.

Unsurprisingly, PIII-500 PCs command large!!! prices. (The CPU alone costs PC vendors almost $700.) The three preproduction Dell, Gateway, and Micron PIII-500 systems we tested for this article cost between $2826 and $2899.

We also tested preproduction PIII-450 PCs from Gateway and Micron. Priced at a more palatable $2359 and $2699, respectively, they're not much slower than the PIII-500 machines. All five

PHOTOGRAPHS: ROBERT CARDIN; ICONS: JEFFREY PELO

Dell Dimension XPS T500

systems are loaded: 128MB of RAM, hard drives as large as 22GB, big monitors, and the latest 3D graphics cards with 16MB of SDRAM.

If you do image editing or other CPU-intensive work, covet the ultimate gaming machine, download and devour every browser plug-in you see, or must have this month's fastest desktop, you may already have your wallet out. But not everyone needs to spring for a PIII. If you work mostly with Microsoft Office–style apps, e-mail, and a Web browser, you can buy a very fast, feature-rich Celeron-400 PC for $1500. An even faster 433-MHz Celeron chip will arrive in mid-March, on PCs selling for about the same price. And there's one other newcomer to consider: AMD's K6-III processor (see page 53).

Gateway E-4200 500

THE NAME GAME

DESPITE ITS name, the Pentium III doesn't represent a generational advance, as the Pentium and Pentium II did.

Micron Millennia 500 Max

Those chips introduced fundamental changes in processing, cache, and system bus technologies. The PIII is basically a PII processor, with the same 512KB off-chip secondary cache and 100-MHz system bus. The rationale for the new name? Marketing!!!

That said, the 70 new CPU instructions Intel calls Streaming SIMD extensions do set the Pentium III apart from its predecessors. The instructions target CPU-intensive jobs—image filtering, 3D geometry calculations, ▶

Windows 99?

MICROSOFT PLANS to upgrade Windows 98 at least once more before retiring the technology underlying the DOS-based operating system. This is a surprise, because the software giant had said that it planned to base its future desktop operating systems on Windows NT. Though it wouldn't specify a ship date for the new version, Microsoft says it will continue to support Windows 98 for another two or three years. Meanwhile, other products are slipping: The service pack for Windows 98, which was previously scheduled to ship in March, now will not be available until "after April," according to a Microsoft spokesperson.

Register or Else

COPIES OF OFFICE 2000 sold to students and schools in the United States and Canada will not function after 50 uses unless registered—a feature analysts think could eventually appear in copies of the product sold to consumers and businesses. Microsoft says it's putting the same antipiracy technology into all Office 2000 copies sold in Australia, Brazil, and New Zealand, but not into standard U.S. editions—at least, not at Office 2000's scheduled spring launch. *Softletter* editor and ▶

GET UP-TO-THE-MINUTE computing news—including the latest developments in the Microsoft antitrust trial, coverage of new products, and Web site reviews—from PC World Online's News area at www.pcworld.com/pcwtoday.

and waveform analysis—that would tax even a fast Pentium II. This change is similar to the addition of MMX instructions to Pentium processors a few years ago. And just as new applications had to be written to take advantage of MMX instructions, apps must be rewritten or updated to utilize the new SIMD extensions. Existing software will run no faster on a PIII-450 system than on a PII-450.

The Pentium III's other notable feature: Intel assigns each PIII chip it produces a unique, hard-coded ID number. In January, Intel announced this processor ID number as a boon to corporate asset management and e-commerce, but privacy advocates cried foul. (For a close look at this topic, see "Intel Adds ID Number to PIII," page 56.)

A SNEAK PEAK at the Pentium III's voice recognition abilities impressed Susan Fry.

BLAZING BUSINESS APPS

THERE'S NO controversy about the PIII-500's ability to sprint. Micron's $2899 Millennia 500 Max turned in a PC WorldBench 98 score of 237, the best Windows 98 score we've ever seen. This PC darts through business apps about 11 percent faster than the average PII-450 machine, and about 17 percent faster than the average PII-400—and those are no slowpokes. Dell's $2826 Dimension XPS T500 and Gateway's $2899 E-4200 500 came very close to the Millennia 500 Max's performance, with PC WorldBench 98 scores of 234 and 235, respectively.

The number 500 draws a crowd, but before you join in, take a close look at how the PIII-450 systems from Gateway and Micron did: They garnered WorldBench scores of 218 and 219–only about 7 percent slower than the PIII-500 systems. That difference will be negligible as you brood over a Word or Excel document. And these systems cost substantially less. Gateway's $2359 E-4200 450, in particular, stands out for its price. (We tested a configuration with a 10GB hard drive; Gateway submitted a similar model with a 22GB hard drive for our *Top 20 Power Desktops* review; see page 222.) Some PC vendors, including Micron and Gateway, are dropping previous Pentium II-450 models for similarly priced Pentium III-450s. They will continue to sell PII-450s to corporate customers that prefer to standardize on the same CPU.

At press time, Intel announced a 550-MHz version of the PIII; systems based on that chip are expected to ship in the second quarter.

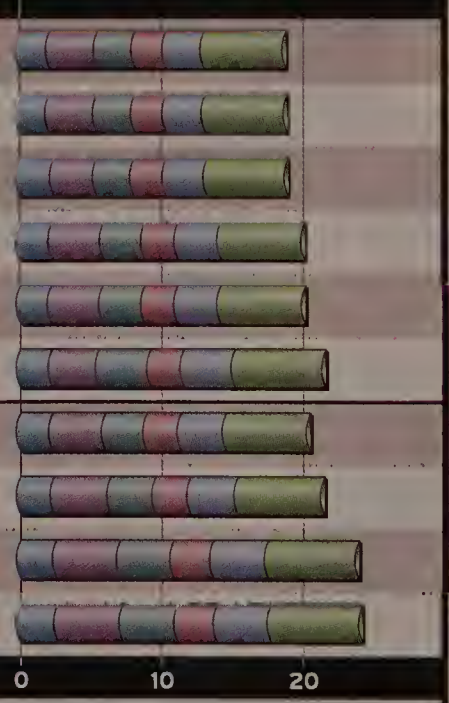
QUICK GRAPHICS

THE PIII-500 systems looked lively in our regular suite of graphics tests, which uses applications like PowerPoint 97 that aren't enhanced

DESKTOP PCs: BUSINESS APPS — TEST REPORT

Pentium III-500: Record-Setting Win 98 Performance

SYSTEM	CPU	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score
Micron Millennia 500 Max	Pentium III-500	128	512	237
Gateway E-4200 500	Pentium III-500	128	512	235
Dell Dimension XPS T500	Pentium III-500	128	512	234
Micron Millennia 450 Max	Pentium III-450	128	512	219
Gateway E-4200 450	Pentium III-450	128	512	218
CyberMax Enthusiast KIII 400	AMD K6-III-400	128	256[1]	202
Average of 37 systems	Pentium II-450	128	512	214
Average of 11 systems	Pentium II-400	128	512	203
1 system	AMD K6-2-400	128	1024	181
2 systems	AMD K6-2-400	128	512	180



Word 97 · Word Pro 97 · Excel 97 · 1-2-3 97 · Paradox 8.0 · Picture Publisher 7.0

TEST PC WORLD CENTER

HOW WE TEST All systems are tested with PC WorldBench 9B, *PC World*'s application-based benchmark. A higher PC WorldBench 9B score is better. For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). Data based on testing conducted by the PC World Test Center. All rights reserved. [1]Has an additional, 1024KB third-level cache on the motherboard.

PHOTOGRAPH, LEFT: ROBERT HOLMGREN; RIGHT: ROBERT CARDIN

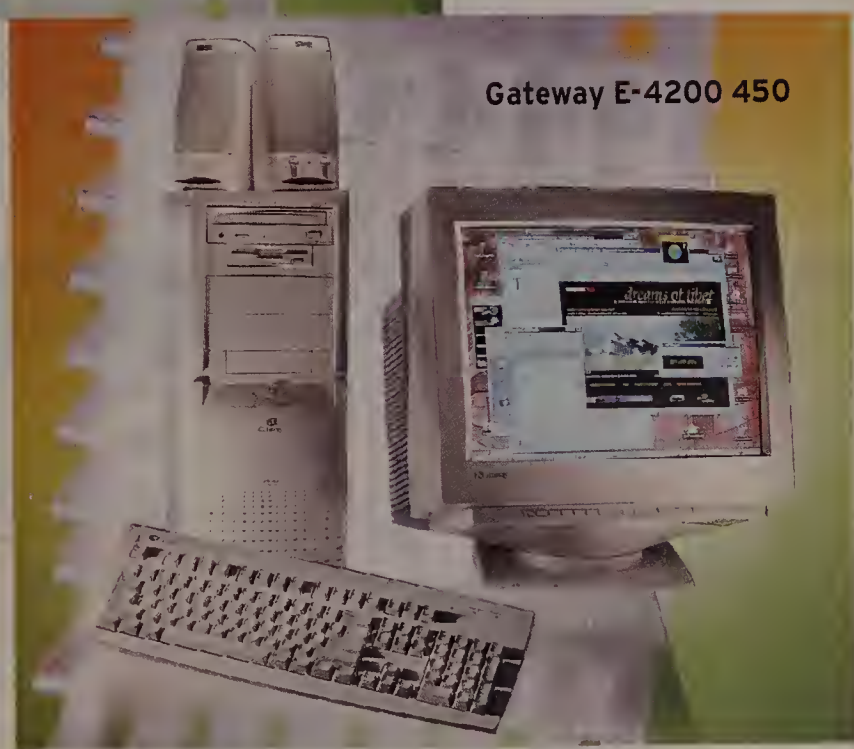
for the Streaming SIMD instructions. But remember, the systems' graphics card plays a huge role in these tasks.

Gateway's 500-MHz system took top honors in all but one graphics test. But the differences between the PIII-500 systems were imperceptible without a stopwatch, except in Caligari's TrueSpace 4.1, a 3D modeling application, where the Gateway really shined.

Micron Millennia 450 Max

Clearly the extra cost of a PIII-500 system doesn't buy much additional performance on these programs, compared to a PIII-450. For example, the Gateway PIII-450 took only five seconds longer to complete the PowerPoint test than Gateway's PIII-500. A PIII-450 with a good graphics card shouldn't disappoint anyone.

The Pentium III PCs have newer, better graphics cards than the Pentium II-400 machines we've examined in the past. Still, when we compared Dell's PIII-500 to an older Dell PII-400 machine, we saw no stunning performance differences in our standard tests. The PIII-500 held an edge of 4 percent in the Director test, 8 percent in the PowerPoint test, and 44 percent in the Redline Racer game test, which measures frames per second. That last gain is less impressive than it sounds, as it's hard for anyone to visually perceive more than 30 frames per second, and fast Pentium II–equipped machines already run many games at that speed.


Gateway E-4200 450

THE NEW APPS

WE'VE BARELY dipped our toes in the pool when it comes to testing apps that capitalize on the new Streaming SIMD extensions. But it was an invigorating dip. Running preliminary versions of three enhanced apps, we saw some dramatic improvements when we stressed the systems with complex tasks and big files.

Rage's new Dispatched 3D game thrives on the SIMD extensions. We played both standard and enhanced versions of the game on 500- and 450-MHz Pentium III systems: The enhanced version pumped out about 37 to 43 frames per second; the standard version, 17 to 18 fps.

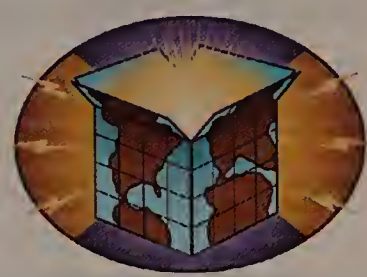
Moreover, the Pentium III should handle more visual detail and higher resolutions at 30 frames per second, Games.net reviews editor Nash Werner says. Improved resolution and color depth will allow PIII PCs to run future games at near-photographic quality, he adds. (All Pentium III systems will ship with Microsoft's DirectX 6.1 preinstalled; 3D games written to that standard should also benefit from SIMD instructions.)

To assess the Pentium III's image editing, we tried out an enhanced plug-in for ▶

publisher Jeffrey Tarter says "they're going after high-piracy markets first, and will move after the others with their usual glacial approach."

Antiporn Bill Blocked

THE CHILD ONLINE Protection Act, lawmakers' latest antiporn bill, won't take effect anytime soon: A Philadelphia federal court has issued an injunction preventing its enforcement. The law calls for jail time and fines for online content providers whose Web sites contain material "harmful" to minors. This development means that the judge thinks the law is likely to be overturned, experts say. The injunction will stand until a government appeal or a full trial on the law's constitutionality takes place, which is likely to happen sometime this spring.



Tidbytes

E-mail Can Make You Fat: If you e-mail coworkers from the comfort of your chair instead of walking over and talking to them in person, you're expending fewer calories—potentially enough to add 9.4 pounds of fat to your frame every 5 years, according to Stanford University's Dr. William Haskell. **Free Web Graphics Applet:** NetStudio.com (www.netstudio.com), a Web-based applet from the makers of the NetStudio Web graphics package, lets you create and customize banners, buttons, photos, and headings from within your browser. You can then download your creations as .jpg files and add them to your Web site.

Adobe Photoshop 5.0 that's designed to speed up a number of specific tasks. We tested three—including a wave distortion filter and a gradient fill—by applying them to a 20MB image and measuring the total time required to complete the operations. With Pentium III-500 and -450 machines, we consistently achieved performance gains of about 20 percent using the SIMD-enabled plug-in. If you tend to spend large portions of your day tweaking Photoshop images, you'll certainly appreciate the increased efficiency.

Intel is also touting the Pentium III's ability to accelerate streaming media downloaded from the Internet. Only one enhanced browser plug-in was ready for us to test, so we can't give a broad-based verdict on whether the new CPU lives up to that large promise. But our test of Macromedia's new Flash plug-in for streaming animation took an average of 11 percent less time on Pentium III-450–equipped systems than on otherwise identical Pentium II-450 PCs—a notable, though not breathtaking, improvement.

DESKTOP PCs: GRAPHICS APPS — TEST REPORT

New Instructions Make PIII-Ready Applications Fly...

SYSTEM	CPU	Photoshop, PIII-enabled	Photoshop, standard	Flash, PIII-enabled	Dispatched, PIII-enabled	Dispatched, standard
Dell Dimension XPS T500	Pentium III-500	9.7	12.3	50.6	37	18
Gateway E-4200 500	Pentium III-500	9.9	11.9	50	37	17
Gateway E-4200 450[1]	Pentium III-450	10.3	12.6	55.2	37	17
Gateway PII-450[1]	Pentium II-450	14.6	13.9	62	n/a[2]	15
Micron Millennia 500 Max	Pentium III-500	9	11.2	50.6	43	17
Micron Millennia 450 Max[1]	Pentium III-450	10.7	13.4	56.1	42	17
Micron PII-450[1]	Pentium II-450	12.8	13.5	61.7	n/a[2]	16

Each system has 16MB of graphics memory. Faster — Seconds. Frames per second — Faster

TEST PC WORLD CENTER **HOW WE TEST** We tested beta versions of three applications enhanced for the PIII's new instructions: a plug-in for Adobe Photoshop 5.0; Macromedia Flash, a browser plug-in for streaming animation; and Rage Dispatched, a new 3D game. [1]PII-450 and PIII-450 systems were configured identically except for the CPU. [2]Game will not run with PIII's new Instructions enabled on a PII machine.

...but Standard Graphics Apps Enjoy Little Boost

SYSTEM	CPU	Graphics memory (MB)	Presentation test (seconds)	Playback tests (frames per second)
Dell Dimension XPS T500	Pentium III-500	16	146	94, 75, 46, 17
Gateway E-4200 500	Pentium III-500	16	142	96, 55, 56, 25
Micron Millennia 500 Max	Pentium III-500	16	149	94, 72, 47, 17
Gateway E-4200 450	Pentium III-450	16	147	96, 52, 51, 23
Micron Millennia 450 Max	Pentium III-450	16	153	92, 62, 45, 17
CyberMax Enthusiast KIII 400	AMD K6-III-400	16	157	65, 43, 45, 15
Average of six systems	Pentium II-400	8	160	91, 39, [1]
One system	K6-2-400	16	163	64, 36, 39, [1]

Faster — Faster

PowerPoint 97 · Director 6 · Redline Racer · Incoming · TrueSpace 4.1

TEST PC WORLD CENTER **HOW WE TEST** In Microsoft PowerPoint 97, we time a script that builds a 50-slide presentation; lower times are better. Using Microsoft Active Movie, we play back a looping AVI clip while running an animation created using Macromedia Director 6 in the foreground. We also execute self-running demos in Criterion Redline Racer and Rage Incoming. In Caligari TrueSpace 4.1, a 3D modeling program, we play back a tutorial that uses AGP textures. For all four playback tests, higher frame rates are better. Tested applications do not make use of AMD's 3DNow technology. PIII and K6-III systems tested with 128MB of RAM. Data based on testing conducted by the PC World Test Center. All rights reserved. [1]Incoming and Caligari TrueSpace 4.1 are new additions to PC World's graphics test suite, and data is not available for some older systems.

BETTER VOICE RECOGNITION?

WE ALSO PEEKED at perhaps the most promising benefit of the SIMD extensions: improved voice recognition programs with shorter training times and higher accuracy rates. For this purpose, we auditioned a very early PIII-enhanced version of Dragon's Point & Speak voice recognition application. We couldn't formally test it because the software was still very preliminary. And we could not tell how much of the improvement was due to the PIII extensions. Even so, long-time Dragon user Susan Fry declared it was "a vast improvement" over Dragon's NaturallySpeaking program as it runs on her Pentium II-300 PC.

Fry, a San Francisco Bay Area freelance writer, relies on voice recognition to input text since she's developed repetitive strain injuries in her wrists. She spent six months painstakingly fine-tuning her Dragon software to recognize her speech patterns and vocabulary, ultimately attaining a rate of about 90 to 95 percent accuracy. Fry was stunned by the

new version's performance on a Pentium III-500 machine. "It recognized easily 95 percent after two minutes of training—I was floored," she says.

Fry also noted that the software typed words on screen quickly, almost as fast as she spoke them. Still, until Dragon's shipping version is available for testing, it's hard to tell how much of the improvement is due to the PIII extensions and how much stems from better software coding.

At press time, Intel told us that software vendors would be turning out dozens of applications optimized for the Pentium III, a good number of them by early summer. (For more information on these applications, see "Enhanced Software for Pentium III PCs," page 54, and look for follow-up coverage in next month's *Top of the News*).

These enhanced applications will not change most people's daily PC routine. Like the MMX instructions Intel added to its Pentium line ▶

AMD's K6-III Takes On Intel's PIII

LOOK OUT INTEL: AMD thinks it has an answer to the PIII. AMD's newest processor, the K6-III, should be shipping in a 400-MHz version by the time you read this; a 450-MHz chip will follow. We obtained a preproduction K6-III-400 PC from CyberMax and tested it with our standard business applications, which don't support AMD's 3DNow instructions. The system ran noticeably (12 percent) faster than K6-2-400 systems we've seen. But AMD claimed the new CPU would outrun a PIII-450; this K6-III-400 system didn't. We'll have to see more PCs, especially 450-MHz models, before giving the K6-III a thumbs-up or -down. Still, the processor clearly has potential.

CACHE VALUE

ON THE BITS-AND-BYTES level, the K6-III doesn't differ radically from its predecessor, the K6-2. But AMD placed 256KB of secondary cache on the K6-III chip itself. As a result, the cache runs at the chip's full core speed instead of at half-speed, as is the case with the off-chip secondary cache in Pentium II and Pentium III chips. The K6-2's secondary cache runs at 100 MHz.

> The K6-III continues to use AMD's **3DNow** CPU instructions to **accelerate** enhanced apps such as **games** and **graphics** titles.

The K6-III continues to use AMD's 3DNow CPU instructions to accelerate enhanced applications such as games and graphics titles. The instructions haven't shown up in many business apps yet, but they're gaining popularity among game makers.

We tested CyberMax's $1799 Enthusiast KIII 400 against similarly configured PIII-450 and PIII-500 systems that cost $550 to $1100 more. The Enthusiast earned a PC WorldBench 98 score of 202, which is plenty fast for business apps. The PIII-450 and -500 systems ran business apps 8 and 17 percent faster than the CyberMax, respectively.

NOT AHEAD...YET

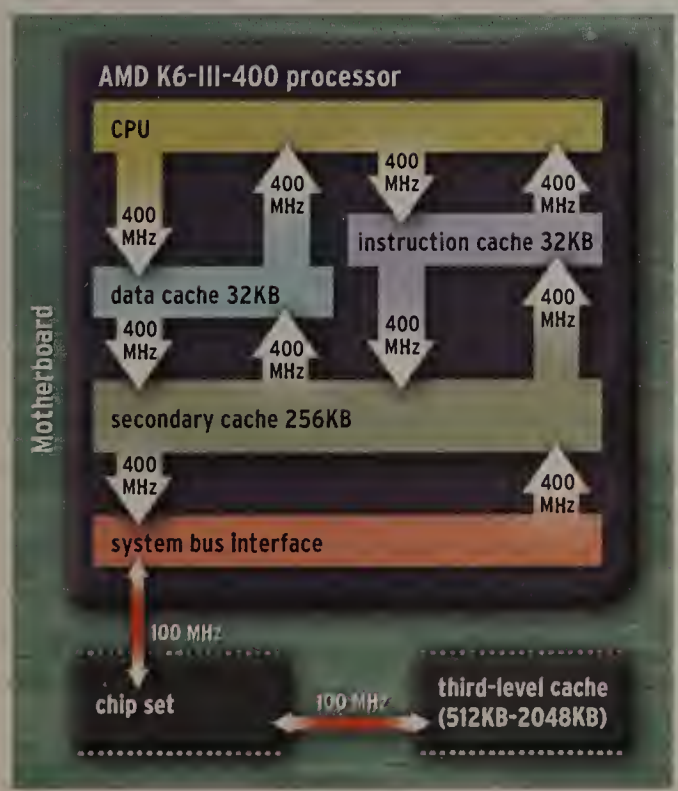
IN OUR STANDARD graphics tests, which do not yet include any applications enhanced for 3DNow, CyberMax's system could not keep up with the PIII PCs, although its 16MB STB Velocity 4400 graphics card is no weakling. The CyberMax did match the PIII-450-based Micron Millennia 450 Max on one game, Incoming. We tested a 3DNow-enhanced version of Quake on the CyberMax and saw a speed improvement of about 6 percent over the game's standard version.

Like the more expensive Pentium III machines, the CyberMax Enthusiast is generously configured: 128MB of RAM, a 13GB hard drive, a 19-inch monitor, a 4.8X DVD-ROM drive, a V.90 modem, a 3D audio sound card, and Altec Lansing speakers and subwoofer. This may not be the fastest system on the road, but at $1799 it's a good buy, given its configuration. We'll have test results for K6-III-450 machines and 3DNow graphics in next month's issue.

The real star of AMD's show, however, is likely to be its next-generation K7 processor, expected around midyear. The new chip will debut at 500 MHz or more, and its accompanying chip set will support an impressive 200-MHz system bus. Analysts think the K7 may finally put AMD ahead in the performance game.

Inside the K6-III

AMD'S NEW K6-III processor has one interesting technical advantage: a 256KB on-chip secondary cache that can pass data to and from the CPU at the processor's full speed (400 or 450 MHz). The secondary caches supporting Intel's Pentium II and III chips, by contrast, run at just half the CPU's speed. The K6-III's on-chip arrangement helps the PC complete application tasks quickly. Some K6-III systems will also contain a third-level cache, created when a PC vendor plugs a K6-III chip into a K6-2 motherboard that already has 512, 1024, or 2048KB of secondary cache. This should speed up some work involving large files.



Enhanced Software for Pentium III PCs

THE PENTIUM III processor's 70 new CPU instructions, which Intel calls Streaming SIMD extensions, help certain applications work faster. To take full advantage of the instructions, an application must be written or revised specifically for them. What kind of software will be enhanced for the Pentium III? For now, you can expect mostly games, graphics tools, browser plug-ins, and voice recognition programs. Here's a peek at some of the first examples.

■ **ADOBE PHOTOSHOP 5.0 PLUG-IN** Adobe plans at least one plug-in that will speed up specific PhotoShop tasks like color blending and gradient fills, as well as many filters.

■ **DRAGON POINT & SPEAK AND NATURALLY-SPEAKING** Dragon promises shorter training times and improved accuracy in upcoming PIII-enhanced versions of Point & Speak, its basic voice recognition package, and its more advanced NaturallySpeaking.

■ **INTEL VIDEOPHONE** Intel's videophone software will utilize the Pentium III instructions to smooth out videoconferencing playback, the company says. Look for it in an upcoming version of the Create and Share videoconferencing package.

■ **MACROMEDIA FLASH AND SHOCKWAVE** Pentium III-enhanced versions of Macromedia's Web browser plug-ins will accelerate streaming animation and playback of interactive content such as games and ads.

■ **MICROSOFT POWERPOINT 2000** Microsoft's Netshow streaming media format will soon become part of PowerPoint 2000; the Pentium III instructions shorten encoding time, which is a boon to Web content producers, according to Microsoft.

■ **RAGE SYSTEMS DISPATCHED** The makers of the popular Incoming game have created a new motorcycle-chaser.

■ **REALPLAYER G2** The reigning streaming-video plug-in will improve the look of clips by generating intermediate frames.

■ **SPIKE 3D PLAYER** This new media player delivers 3D interactive animation you can click on, listen to, and manipulate.

■ **ULEAD COOL 3D 2.5 AND PHOTO EXPRESS 2.0** Upcoming enhanced versions of Ulead's 3D graphics application and image-editing program will utilize Pentium III instructions to accelerate certain effects and tasks, such as merging two images.

(and all subsequent processors), the Pentium III instruction set will probably blend into the background of your PC's capabilities, offering a modest boost here and an occasional dramatic speedup there. Within a year or so, the Pentium III will simply supplant the Pentium II, just as the Pentium II replaced the original Pentium.

On the operating systems front, the newest versions of Windows are ready for the Pentium III. But unless you use Windows 98 or Windows NT 4.0, you'll forfeit the performance gains of the SIMD instructions. Both Win 98 and the upcoming Windows 2000 OS support the new instructions. Microsoft will supply a Pentium III compatibility patch for Windows NT 4.0—but not for Windows 95.

TO HAVE OR TO HOLD

IF YOU HAVE $2800 to spend on a 500-MHz Pentium III, go ahead: Enjoy. Though not everyone should pay top dollar for a Pentium III-500, these systems do provide significant performance gains on tough applications like Adobe Photoshop, and they fly through games. Tantalizing performance breakthroughs in voice recognition could present further enticement. And home-oriented, less generously configured PIII-500–equipped models can be had for something more like $2500; see *Top 10 Home PCs*, page 242.

But beware of buyer's remorse. Pentium III systems due in the year's second half will run at better than 550 MHz, and some will pack 133-MHz system buses, as well as speedier graphics cards. The faster system bus should be a boon to people who work with large files. By the end of the year, the Pentium III may be speeding along at 700 MHz.

And by the way, if you're thinking of purchasing a Pentium III chip and plugging it into an existing Pentium II motherboard, do your homework first: Many Pentium II motherboards are not compatible with Pentium III chips.

The rest of us looking to buy a power desktop in the short term must decide between the more reasonably priced Pentium III-450 PCs and the even cheaper Pentium II-400s. Pentium II-400s run office applications quickly enough for most people, and should sell for as little as $1700 by the time you read this. But at that price, they won't offer as rich a configuration, and they won't give you access to enhanced graphics applications, games, Web plug-ins, or voice recognition programs.

If such benefits don't matter to you, however, you should also carefully consider a sub-$1500 system that's based on a lower-cost CPU—Intel's Celeron-400 or Celeron-433, or AMD's K6-2-400.

And if you want to hedge your bets, check out a more modestly configured Pentium III-450 system. By the time you read this, Micron hopes to offer such a model for a frugal $1900. That's a Pentium III price we can get excited about—even without three exclamation points.

Testing for this story conducted by Ulrike Diehlmann, Nancy Miller, and Mike Salayko of the PC World Test Center. ▶

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Intel Adds ID Number to PIII—Should You Worry About Big Brother Inside?

ANALYSIS

WHEN INTEL releases a new processor, consumers usually greet the announcement with cheers. But when the company unveiled details of its new Pentium III CPU in January, the cheers were momentarily drowned out by jeers as privacy advocates called for a boycott of the silicon giant and any computer company that ships PCs bearing the new chip.

At issue is Intel's plan to hardwire a unique Processor Serial Number into each PIII chip. Intel says these 96-bit numbers will enhance security for e-commerce and help corporate IT officials manage PCs and software. Critics say the ID is a "super cookie" that Web masters can use to track your every move online and inundate you with yet more unwanted spam.

A DELICATE BALANCE

AS INTEL SEES it, the PSN will make e-commerce more secure by enabling Web sites to authenticate users more easily. Suppose, for example, that you register with Stocksrus.com to buy a few shares of the latest Internet IPO. Stocksrus.com wants to make sure you are who you say you are. So in addition to asking for a user name and password, the site grabs your PSN. Then the site matches up your user ID with your PSN, files that information away, and uses it to verify your identity the next time you log on—or to stop someone else from buying stock in your name.

The problem, say critics, is that the PSN makes it much easier to track your Web wanderings—and to gather valuable marketing data about you. Stocksrus.com, for example, now has your name, your password, your PSN, and a list of stocks you've bought. A week later, you visit a site called Retiretoday.com, with which Stocksrus shares customer data. Imagine your surprise when, on your first visit, Retiretoday.com greets you by name and directs you to a sales pitch for a risky new mutual fund (remember, it knows what kind of investments you like). And imagine your irritation when Retiretoday starts spamming you with daily e-mails asking you why you haven't visited lately.

"The net result is that, if you give your identity to any site on the Web, any site it shares data with will know all about you," says Jason Catlett, president of Junkbusters, a consumer advocacy group dedicated to fighting junk mail and spam.

Privacy activists like Junkbusters aren't the only ones concerned about the PSN. Shortly after the Pentium III announcement, Representative Edward Markey (D-Mass.) wrote to Intel CEO Craig Barrett, saying that the PSN raises "serious privacy issues" and asking him to rethink its implementation. In Arizona, a state legislator introduced a bill that would make it illegal for any company in the state to manufacture or sell a PC chip containing a unique identifying number (Intel has two chip plants in Chandler, Arizona). At press time, the bill hadn't yet been formally introduced, and reports indicate it may be watered down enough to put Intel in the clear.

CPU ID Number: Love It, Hate It?

Intel says:	Critics say:
The processor serial number will make e-commerce more secure by giving Web sites another way to authenticate users.	The PSN is another way for Web sites to share information about you—and, security experts say, it authenticates systems, not users.
Web sites that use the PSN for authentication will be encouraged to "hash" the number so it can't be shared with other Web sites.	Even if Intel recommends that Web sites mask the PSN by hashing it, there's no way to ensure that sites will do so.
By default, the processor serial number is turned off; users will have to turn it on.	Vendors don't have to include the PSN control utility. And sites may bar users who don't turn on the number.

TOO LITTLE, TOO LATE

INTEL ANTICIPATED such criticism—the company even briefed privacy groups (although it won't say which ones) before announcing the PSN—and came up with a three-pronged response.

First, the company created a utility that permits users to turn the ID number off; theoretically at least, the utility will ship with every Pentium III system. Initially, Intel planned to have the PSN turned on by default, so users would have had to use the utility to turn it off. But in response to critics, Intel now recommends that vendors set the control utility default to "off." In that case, consumers would have to change the default setting to "on" and then restart their computer before the PSN would be readable.

Second, the company is recommending that Web sites mask users' PSNs. One way this might work: When you visit a site, it would send you an ActiveX applet. That applet would read your PSN, then mathematically combine it with the site's own unique ID number to create a third number (a process also known as "hashing"). The applet would send this third, hashed number back to the site, which would use it instead of your PSN to track you. Because this hashed ID number would be unique to each user/site pair, it would be meaningless to other sites; it would also be useless to any hackers who might be snooping on the line.

Finally, Intel is working with Trust-e (a firm promot- ▶

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Intel to Bring Subatomic Security to Your PC

THE PROCESSOR Serial Number is just one part of Intel's strategy to build security into hardware. The CPU giant is also backing three other technologies it says will make computing safer for both end-users and online merchants.

The most important of these for the average user: A random number generator that will be built into new Intel chip sets starting later this year (Intel doesn't yet have a firm date).

Why random numbers? Because they're essential to good encryption. Trouble is, for a variety of geeky reasons, it's virtually impossible to generate truly random numbers using software alone. Intel's new chip set will do so by measuring thermal noise—the subatomic buzz created by thermally agitated electrons. This noise is truly random, so numbers based on it are, too.

Intel's new chip set will measure thermal noise—the subatomic buzz **created by thermally agitated** electrons.

Encryption vendors will have to rewrite their software to take advantage of this new feature; one of the most important of these vendors, RSA Data Security, has already announced its support. Security experts are enthusiastic. "If they're really going to put random number generation in hardware," says security consultant Robert Stratton, "we should be sending them flowers."

Intel is also promoting a scheme called Boot Integrity Services (BIS), which will help network administrators securely update client systems. In some networks, clients check with a server during start-up, asking for updates to their system BIOS or start-up files. The server updates the client over the network and the start-up proceeds. On a BIS-compliant system, the server will also send a digital signature along with the file updates; that way, the client knows the server is trustworthy. BIS support is part of Intel's Wired for Management 2.0 specification, which is supported by Compaq, IBM, and other server vendors; new Intel LAN adapters are already BIS-compliant.

Finally, Intel has announced support for IPSec (short for IP Security), a public standard for authentication and encryption over the Internet. Intel recently acquired a company, Shiva Corporation, whose remote access and virtual private networking products rely on IPSec to send sensitive data securely over the Net.

—Dan Miller

ing Web privacy) to help Web sites use the PSN responsibly.

"We're doing everything we can to deliver the benefits, while still managing the concerns," says Pat Gelsinger, vice president and general manager of Intel's Desktop Products Group.

According to privacy advocates, these measures are not enough. Sites could simply block access to users who turn off the PSN—much as some sites refuse to admit users who turn off cookies. And sites could simply read your PSN instead of masking it. "With all the demand for personal information," asks David Banisar, policy director for the Electronic Privacy Information Center, "why would Web sites want to [mask PSNs]?"

Finally, critics argue, Intel can't force PC makers to include the control utility with their systems. At press time, Intel said it expects some but not all of the first PIII PCs to ship with the control utility in place. Without this utility, users would have to resort to the BIOS setup utility to turn the PSN on or off—a far less user-friendly option.

BEYOND PRIVACY

FOR ALL THE brouhaha it's caused, the PSN may not even be that good an authentication mechanism, because it does not identify the user—just the system. What happens if you use more than one PC? If you log into Stocksrus.com from your notebook instead of your usual desktop PC, will the Web site let you buy stocks? And what happens if you upgrade your system?

"With all the **demand for personal information,** why would Web sites want to **mask PSNs?"**

—David Banisar, policy director, Electronic Privacy Information Center

"If the express purpose is to...authenticate a user's identity, [the ID number] belongs on a smart card," says Robert Stratton, vice president and chief technologist of Security Design International in Falls Church, Virginia. Furthermore, to satisfy privacy-conscious Web surfers, cookie-filtering programs will almost certainly be updated to mask the PSN.

In spite of these questions, at press time neither Intel nor its critics had softened their positions. Leaders of the boycott say they won't call it off until Intel removes the PSN. Meanwhile, Intel is moving ahead as planned. The first PIII-equipped computers were expected to start shipping to consumers in early March.

—*Roberta Furger* ▶

PHOTOGRAPH: KATHERINE LAMBERT; ILLUSTRATION: JEFF BERLIN

*Estimated reseller price to end users for IBM PC 300GL model 6287-41U; monitor shown is IBM G-54 with 15" screen and 13.7" viewable image starting at $239; certain features described below are available for an additional charge. Actual prices may vary. MHz denotes microprocessor internal clock speed only; other factors may also affect application performance. PCs in this ad include an operating system. IBM product names are trademarks of International Business Machines Corporation. Wake on LAN is a product of IBM/Intel Advanced Manageability Alliance and is a trademark of IBM Corporation. Intel, the Intel Inside logo and Pentium are registered trademarks of Intel Corporation. © 1999 IBM Corporation. All rights reserved.

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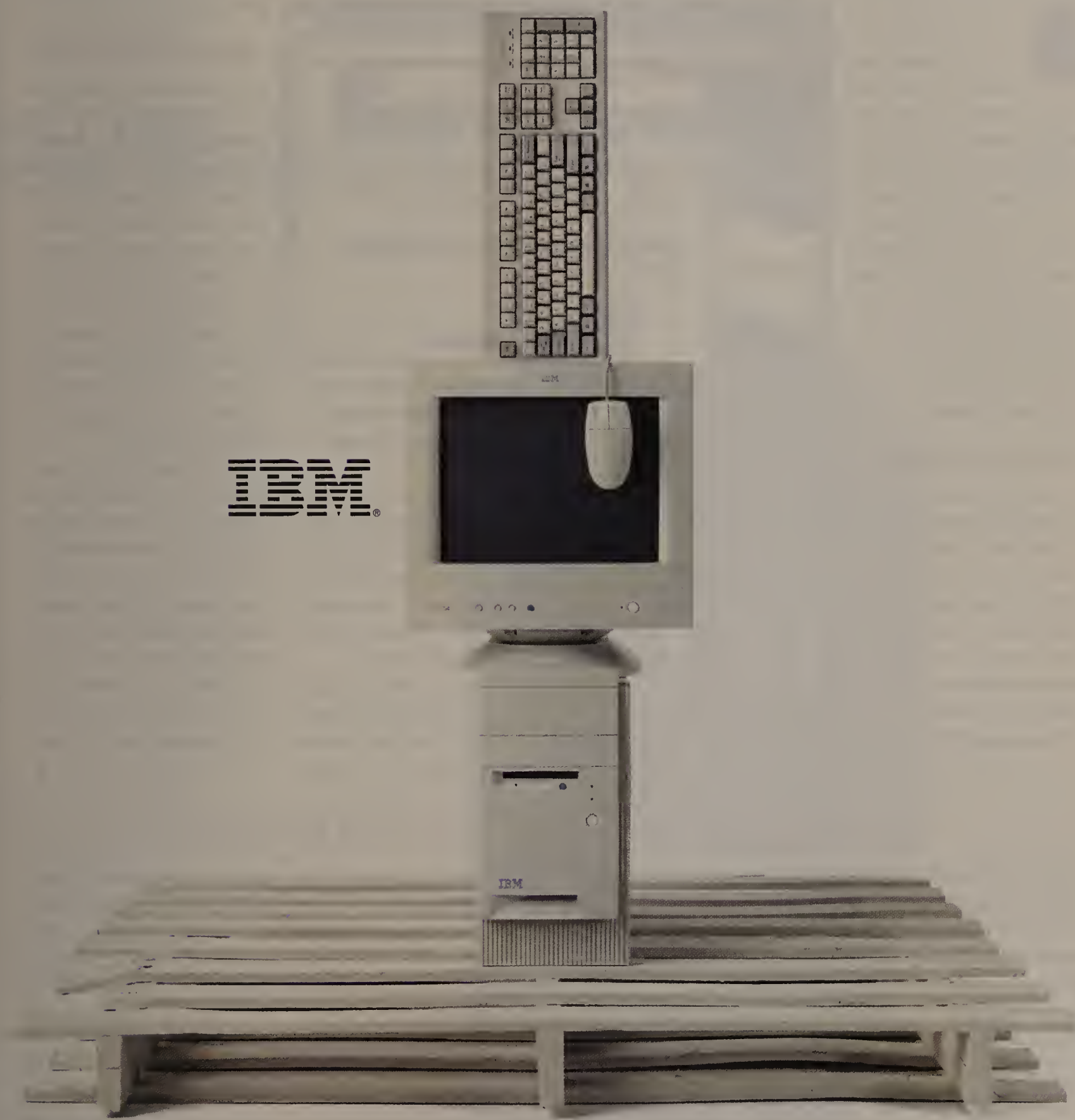

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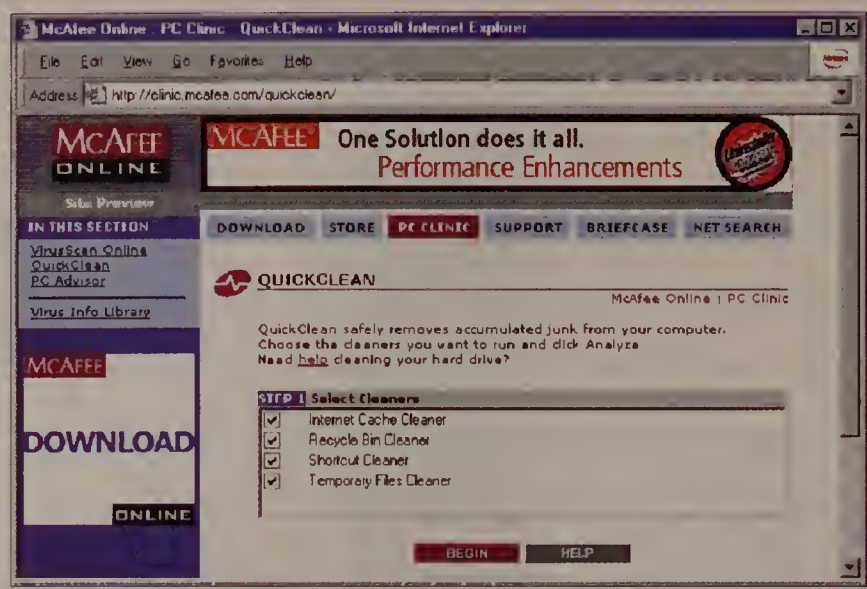
Web-Based Utilities and Productivity Apps Spell Lower Prices and Easier Upgrades

THE BEST things in life aren't free anymore. Although most Web users don't want to pay anyone for anything, major software vendors, including McAfee and Symantec, are starting to charge—by the month, by the year, or by use—for new, Web-based versions of popular shrink-wrap software. This new approach to software distribution promises lower prices, fewer maintenance headaches, and effortless upgrades.



MCAFEE CLEANS UP: McAfee's Web-based QuickClean utility, found on its PC Clinic site, removes some excess files, but for heavy-duty removal of unwanted apps you need the shrink-wrapped Uninstaller.

DO IT WITH A BROWSER

WEB-BASED programs typically consist of two pieces, one that resides on the vendor's Web server and a downloadable client you keep on your hard drive. You run the program through your browser, usually only when you're connected to the Internet.

This approach allows a vendor to install bug fixes and updates on its server, so you're always running the latest version without having to fuss with patches or upgrades. Moreover, server-based applications make life easier for IT staffers who have to maintain software on multiple systems.

Web-based software is also a cheap choice for applications you use only occasionally. You may not use a file conversion utility often enough to spend $50 for a desktop application, but a few dollars to convert an important e-mail attachment to a readable format at 2 a.m. is probably a good deal.

Subscribing to a site that offers several Web-based apps has further benefits. Services may be cheaper than buying several retail packages and upgrading them each year. For example, McAfee's PC Clinic site will charge $50 a year for a set of three Web-based versions of retail packages that sell for about $40 each.

BANDWIDTH MATTERS

BUT WEB APPS do have limitations. Some don't match retail packages feature for feature. This is partly due to Web limitations. For example, most shrink-wrapped antivirus packages run in the background, constantly checking your PC for viruses. In contrast, the Web-based virus scanners we tried out check for viruses only when you're connected and running the package on the vendor's Web site.

If you've got a slow Net connection, the programs can be tedious to use. Downloading the client software evaluated for this story took as long as an hour via a 33.3-kbps modem. And programs that involve uploading and downloading large files to and from a server—like a file conversion utility for graphics—can be a pain.

Note that not all Web ▶

Free Internet Calendars Do It All for You

LOOKING FOR freebies? The big news for cheapskates is the proliferation of online personal calendars. While sites such as **Visto Briefcase** (www.visto.com) have let users enter and access appointments from a browser, a raft of new sites offer slicker features.

SIGN-UP page for Jump.

Most of the newer calendar sites, such as **Jump** (www.jump.com) and **Magical Desk** (www.magicaldesk.com) also provide other personal information management features such as free address books and to-do lists. Another new site, **AnyDay.com** (www.anyday.com), lets you print customized views of schedules and address books or add events to a public calendar. For fancier group scheduling features such as the ability to check for conflicts before setting up a meeting, check out **Schedule Online** (www.scheduleonline.com).

Others sites, such as **When.com** (www.when.com) and **SuperCalendar** (www.supercalendar.com), offer long lists of public events—rock concerts, art exhibits, and so forth—that can be added to your calendar with the click of a mouse.

If you already use a personal digital assistant or a PIM for your calendaring, pick an online calendar that allows you to sync with your existing time-tracker. Yahoo (www.yahoo.com), for example, now lets users synchronize their Web schedules with Palm devices and Microsoft Outlook via a free TrueSync application developed by Starfish. Other sites offer or are adding synchronization capability, either for free or for a small fee. Without this capability, you might have to manually enter every appointment twice—or worse, live with discrepancies.

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software runs on all browsers. While all the apps we saw will run on the latest version of Internet Explorer, a couple of them, such as McAfee's PC Clinic, did not yet work on Navigator. Users with esoteric browsers like Opera may be completely out of luck.

In February we examined online tax software (see www.pcworld.com/feb99/taxes), one of the first major application types to be offered for a fee on the Web. Now utilities vendors are following suit.

UTILITIES R US: Mijenix's upcoming EFix-It site is expected to provide a wide range of Web-based utilities for just $5 per month.

ONLINE UTILITIES

MCAFEE'S NEW PC Clinic site (clinic.mcafee.com) is one of the most ambitious Web-based utility offerings we've seen. As of this writing, the site offered virus scanning, disk cleanup, and PC troubleshooting. By the time you read this, McAfee plans to have added a year 2000 diagnostic utility and a version of Oil Change that tells you about available patches and upgrades for your system's hardware drivers and software. The company plans to expand the site with four additional utilities each quarter for no additional charge.

PC Clinic is a good, inexpensive option for average PC users. The beta versions of its software are relatively easy to download, install, and run. However, the PC troubleshooting and disk cleaning apps lack many of the more advanced components of their respective retail counterparts, Uninstaller and First Aid.

Over a year ago, Symantec introduced Norton Web Services, a subscription-based site whose only software component was Live Update Pro, an Oil Change–like update utility. By early this spring, the company plans to have beefed up the site by adding its Vital Check virus-scanning utility, which was previously available only from ISPs. The price for the service is to remain unchanged: $4 per month or $30 for a year. Symantec bundles a free six-month subscription to the site if you buy its shrink-wrapped SystemWorks ($70) or Norton AntiVirus Deluxe ($60), which include far more robust utilities.

Another major utilities vendor, Mijenix, is developing EFix-It, a site based on its new, Fix-It Utilities 99 application. (The site address had not been set at press time.) Mijenix says that the site will offer a large selection of services ranging from disk repair and defragmentation to hardware diagnostics, virus scanning and repair, and even Y2K diagnostics. The beta version is due sometime in April, with commercial launch for an anticipated $5 per month (plus fees for some advanced services) planned for early fall.

NET TOOLS

WITHIN A FEW MONTHS, Kiss Software plans to introduce a Web-based product called WebOptimizer, which for $3 to $5 per use will (Kiss claims) improve your Internet connection by adjusting modem and system settings. Alternatively, for $2 to $3, its NetMonitor will inform you of your dial-up connection speed, time online (plus per-minute charges where applicable), and the route your data is taking (useful if you're trying to determine the source of Net congestion). Neither application exists as a stand-alone retail package.

IMSI is preparing to offer an online version of its popular HiJaak Pro graphics file conversion utility. Users who cannot decipher a graphics file in any of 85 supported formats will be able to upload it to the hijaakpro.com Web site and have it converted to a format they can read. Initially the service will be available for free, but IMSI plans to eventually charge either a flat-rate or a per-file fee for the service.

FUTURE WEBWARE

ONLINE TAX programs and utilities are just the beginning of what could be a major shift toward Web-based soft- ▶

Y2K REPORT

WHEN THE NEW century rolls around, Microsoft's headaches will be your headaches. Not surprisingly, the software giant has its share of millennium-based bugs, and it's offering free tools to help stamp them out.

Fixes From Microsoft

■ **EXCEL Y2K PLUG-INS:** Microsoft has created three add-in wizards to help you catch problem dates before they catch you. Among other things, these wizards reformat all of a worksheet's dates to show four-digit years, and display warnings when you enter dates with ambiguous century values. These wizards are worth downloading, but you shouldn't expect them to catch every error. For instance, there's nothing here to catch years entered as two-digit integers (as opposed to dates). The wizards are available on Microsoft's year 2000 Web site at support.microsoft.com/support/kb/articles/Q176/9/43.asp.

■ **Y2K PRODUCT ANALYZER:** This Microsoft freebie, which was unavailable for testing at press time, promises to examine your operating system (if it's NT 4.0 or Windows 95 or 98) and applications (Office 95 or 97), and then install any patches you need to prepare them for the big day. The Analyzer will be downloadable from Microsoft's Year 2000 Web site.

■ **Y2K RESOURCE CD:** Spending a lot of time on Microsoft's Y2K Web site? This free CD-ROM gives you fast access to ▶

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ware. As bandwidth increases, you can expect to see Web versions of mainstream applications, including word processors, spreadsheets, and the like. One Canadian ISP, Maritime Telephone & Telegraph, already offers its Digital Subscriber Line customers Corel's WordPerfect Office and other business applications on a pay-as-you-go basis.

For now, Web-based utilities are worthwhile if you need occasional access to an application and don't want to spend serious money to use it. But remember, you will not get many of the more advanced features found in retail programs. So before subscribing to a Web utility, consider which apps you use, how often you use them, and which features you can do without. On or off the Web, bargain software that doesn't get the job done is no bargain at all.

—*Yardena Arar*

EFix-It
$5 per month; **Mijenix**; www.mijenix.com

HiJaak Pro
Pricing not available at press time; **IMSI**; www.imsisoft.com

McAfee PC Clinic
$50 per year; **McAfee**; clinic.mcafee.com

NetMonitor, WebOptimizer
NetMonitor $2 to $3 per use, WebOptimizer $3 to $5 per use (expected prices); **Kiss Software**; www.kissco.com

Norton Web Services
$4 per month or $30 per year; **Symantec**; www.nortonweb.com

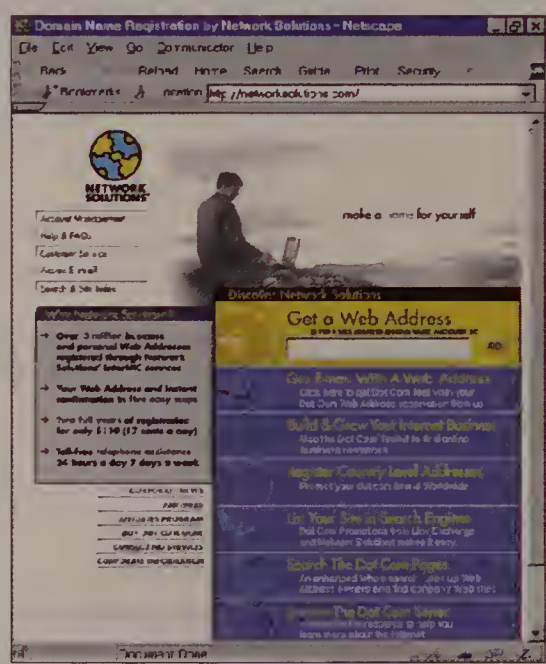
Who's the Master of Your Domain?

UPDATE

THE FOUNDATIONS of the Internet are shifting. This month, after spending a full six years as a monopoly, Network Solutions Incorporated will open up the domain name registration system to competition. That could very well save you some money and—potentially—let you claim new, more descriptive domain names. But plenty of important decisions have yet to be made about just how this brave new Internet will run.

NO MORE MONOPOLY

SINCE 1993, the only way to get a domain name ending in .com, .org, or .net has been to register it with NSI. Sure, all sorts of resellers and ISPs can register a domain name for you, but all of them must ultimately submit the name—and pay a yearly fee—to NSI. But last year,the U.S. government—whose National Science Foundation gave NSI license to register domain names in the first place, and which delegated other aspects of Internet administration to ad hoc groups such as the Internet Assigned Numbers Authority—declared that it wanted out of the Internet business.



NETWORK SOLUTIONS' monopoly on registering domain names ends this year.

As a first step, last October the feds helped form a new nonprofit organization, called the Internet Corporation for Assigned Names and Numbers, to take care of a whole host of Internet administration chores. Four months later, ICANN was just beginning to get down to business. At press time, ICANN was scheduled to meet in Singapore in March. One of its first orders of business: To figure out how to test a Shared Registration System, under which NSI would allow an as-yet-unspecified number of competitors into the registry business. Those tests are scheduled to begin in April; a fully-functional SRS isn't expected until June. ICANN must also consider whether to add more top-level domains (such as .web or .firm) to the current list.

Whatever ICANN decides, opening up the system to competition is likely to benefit end-users. ICANN officials say the price of registering a domain name should drop from the current $35 per year; some analysts predict annual fees as low as $20.

—*Cameron Crotty* ■

information that you'd otherwise have to pull down from Microsoft's site. What you lose, of course, is timeliness, since the Resource CD is updated only quarterly. Microsoft promises that the second version of the CD, due out early in the second quarter, will also include the Excel Y2K plug-ins and the Product Analyzer.

■ **WINDOWS 98 YEAR 2000 UPDATE:** Surprise! Windows 98 has Y2K problems. And Microsoft is offering an online fix that addresses 11 of them. To get it, go to the Windows Update Web page (select *Start•Windows Update*). The problems are pretty obscure (one occurs only if you're booting "at the precise fraction of a second when the date rolls"). But one bug can produce data errors in Phone Dialer's log. A free and easy update, this one's worth obtaining just to be safe.

Advice From Compaq and Shrinks

■ **COMPAQ Y2K INQUIRY LINE:** If you're using a Compaq PC, you can call 800/925-9723 and find out if it—and its accompanying software—is Y2K compliant. But don't expect anything better than your usual technical support experience. One "technician" I spoke to did not understand that the computer's BIOS can show a different century than the CMOS—a very basic part of how the problem affects PCs.

■ **Y2K ANXIETY:** If the whole thing is too upsetting, check out the Y2K anxiety site run by 1-800 Therapist (www.1-800-therapist.com/Y2K.html). The group also has declared December 1, 1999, Y2K Anxiety Day, and it will have volunteer therapists sitting in on online chat forums to counsel panicky people that day.

—Lincoln Spector

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of people want a computer without all those fancy high-tech extras that they don't really need, and might never use anyway.

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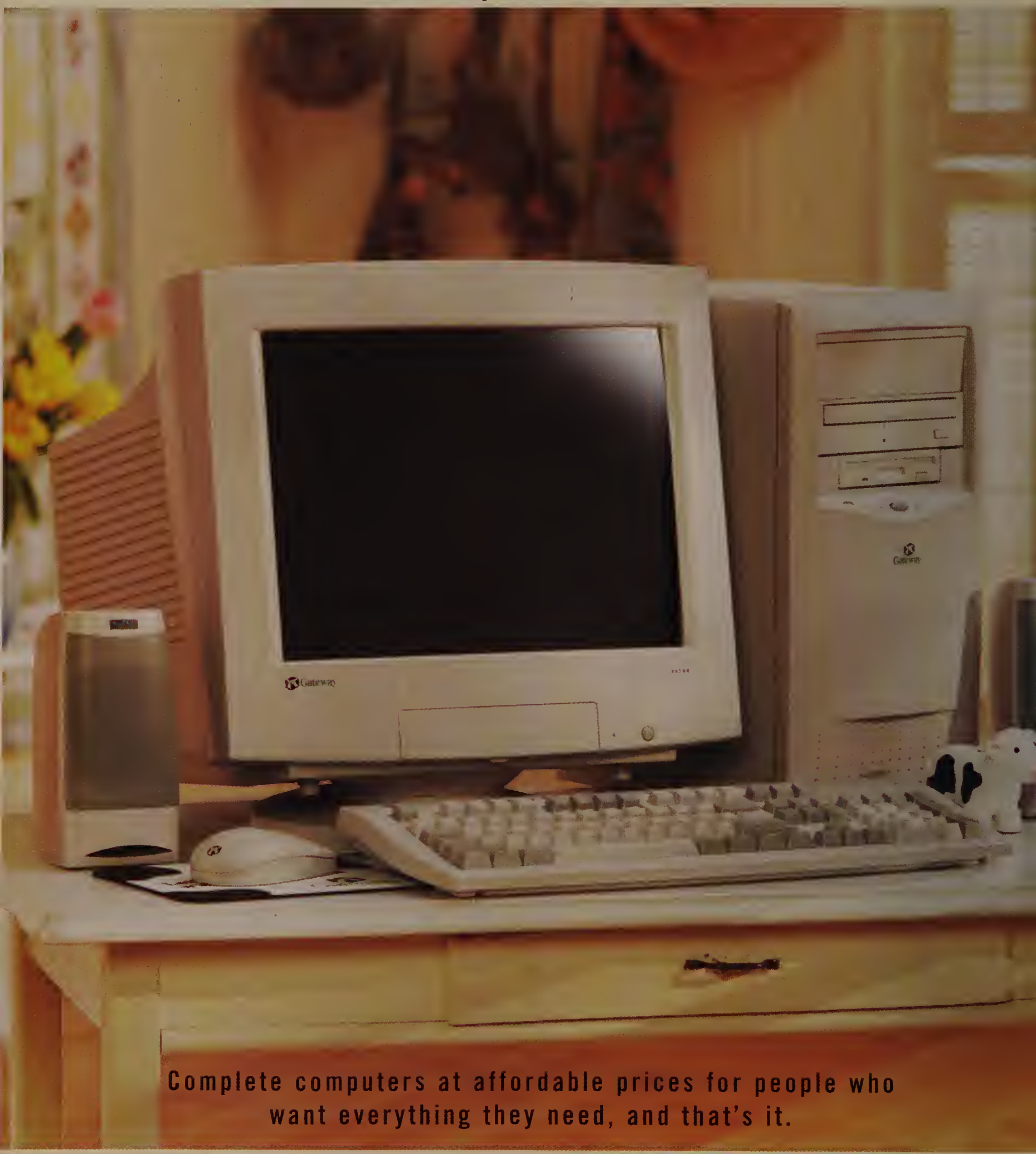

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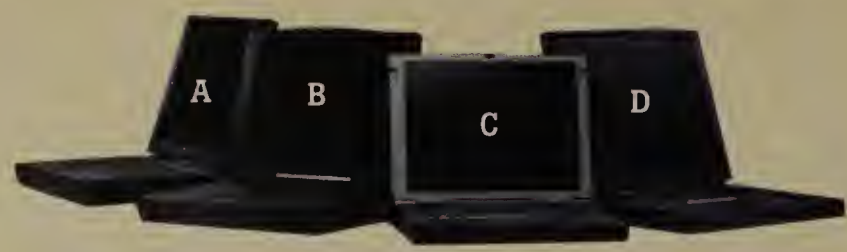

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- V.90 56K[1] Modem
- Casual Case, EZ Pad Pointing Device
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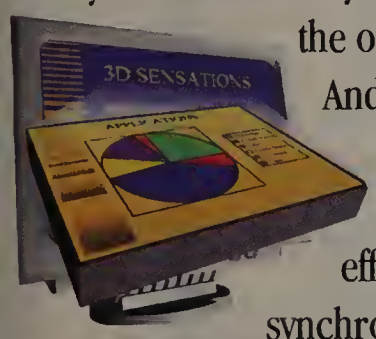

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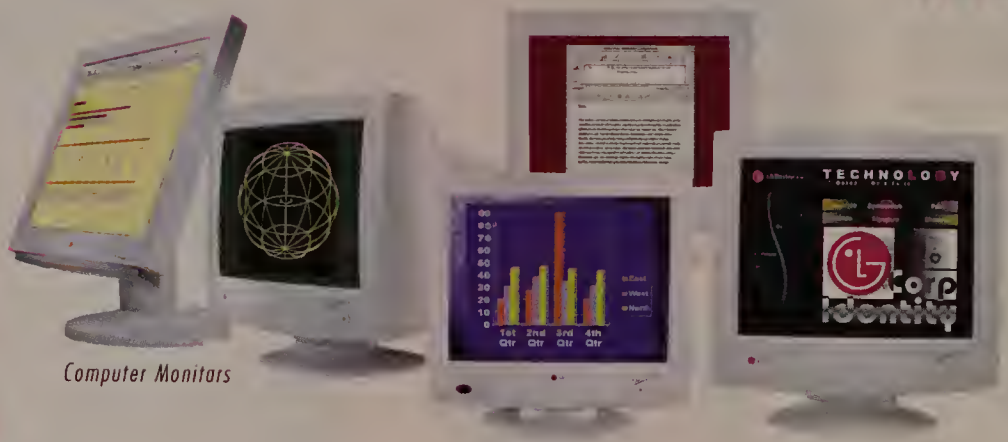

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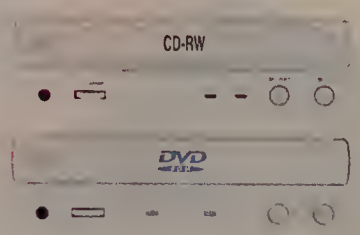

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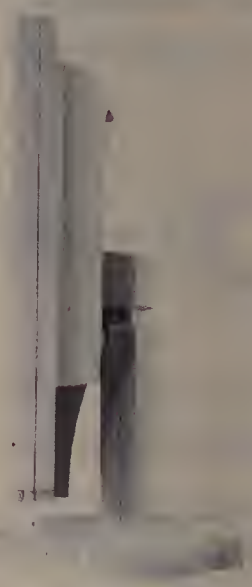

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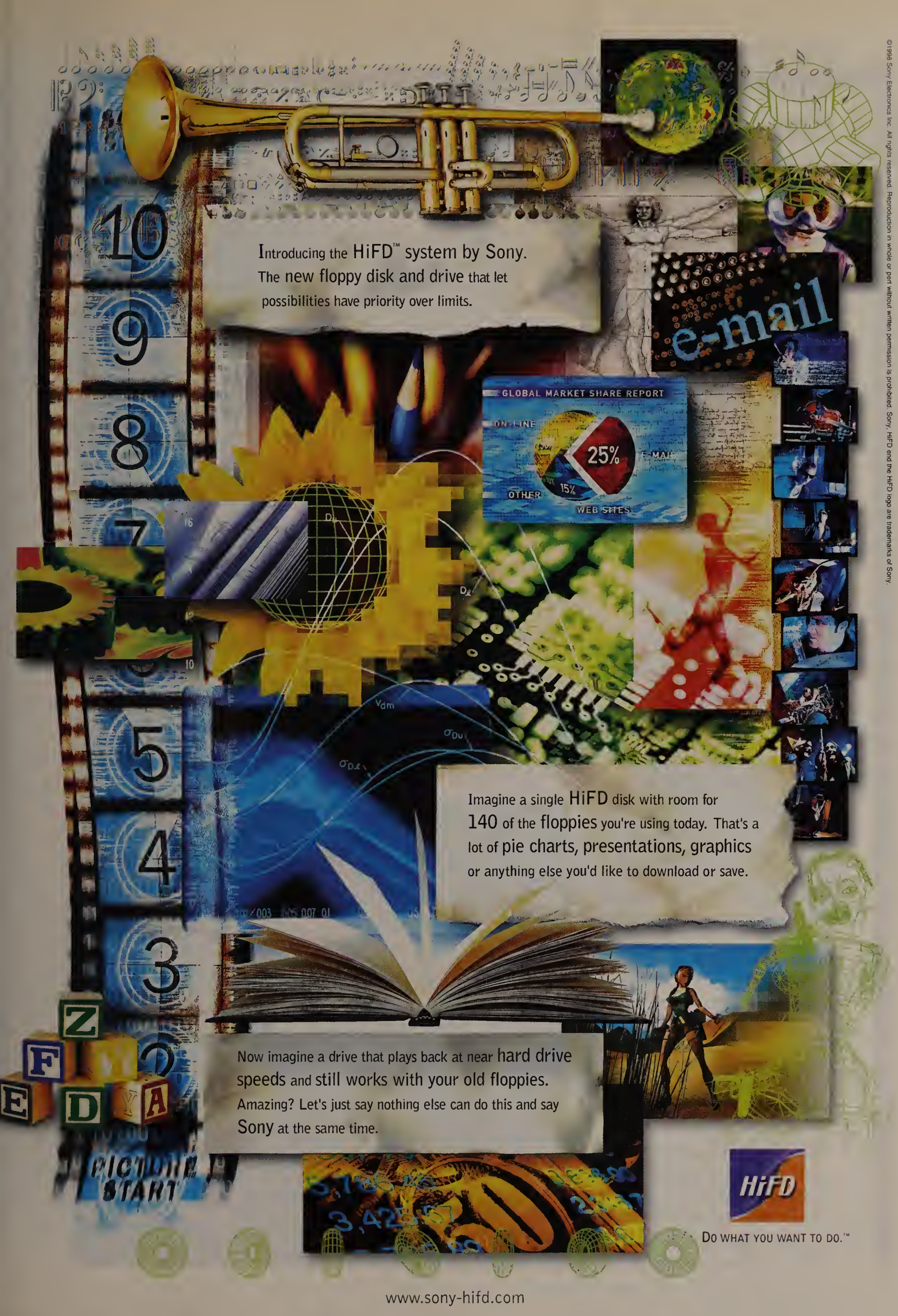
In fact, according to leading practitioners of the new multimedia presentation, putting together a multimedia presentation isn't that much more difficult than using conventional slideware. It just takes a little imagination, a bit more time, and the willingness to start using some different tools.

Take Howard Rubin, for example. As a research fellow at Meta Group in Stamford, Conn., and chairman of the computer science department at New York's Hunter College, Rubin is called upon to make hundreds of presentations every year. He makes his talks as entertaining as they are informative, incorporating sounds and video clips from diverse sources that help his

SONY

By all means, think outside the box. Just put it all back when you're done



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Putting together a multimedia presentation isn't that much more difficult than using conventional slideware. It just takes a little imagination.

audiences connect with his message on a more personal level.

Using a basic video capture device, he includes everything from dinosaurs to "Star Trek" characters to make his point. He'll even use "morphing" tools to transform one image into another, resulting in powerful visual metaphors.

"The tools are there to give anyone building a presentation the power of a television producer," says Rubin. "The software I use is all off-the-shelf stuff that costs under $100."

A CLICK AWAY

Rubin will even jump onto the Internet in the middle of a talk to grab content that's relevant to the topic at hand. "Whatever little computer I'm using basically becomes a nexus between the Internet and the audio/video system and whatever else I plug into," Rubin says. "So, if we're talking about congestion on the 'Net, I can just hop online and show everybody the current Internet 'weather report.'"

Rubin has also gotten away from a strictly linear approach to creating a presentation, instead queuing up all types of content that he can get to with various hot keys. Some of his favorite files are just a keystroke away at all times. For example, he has a classic Groucho Marx comeback available instantly should he encounter any hecklers. "That's great for defusing the situation right away," he adds with a grin.

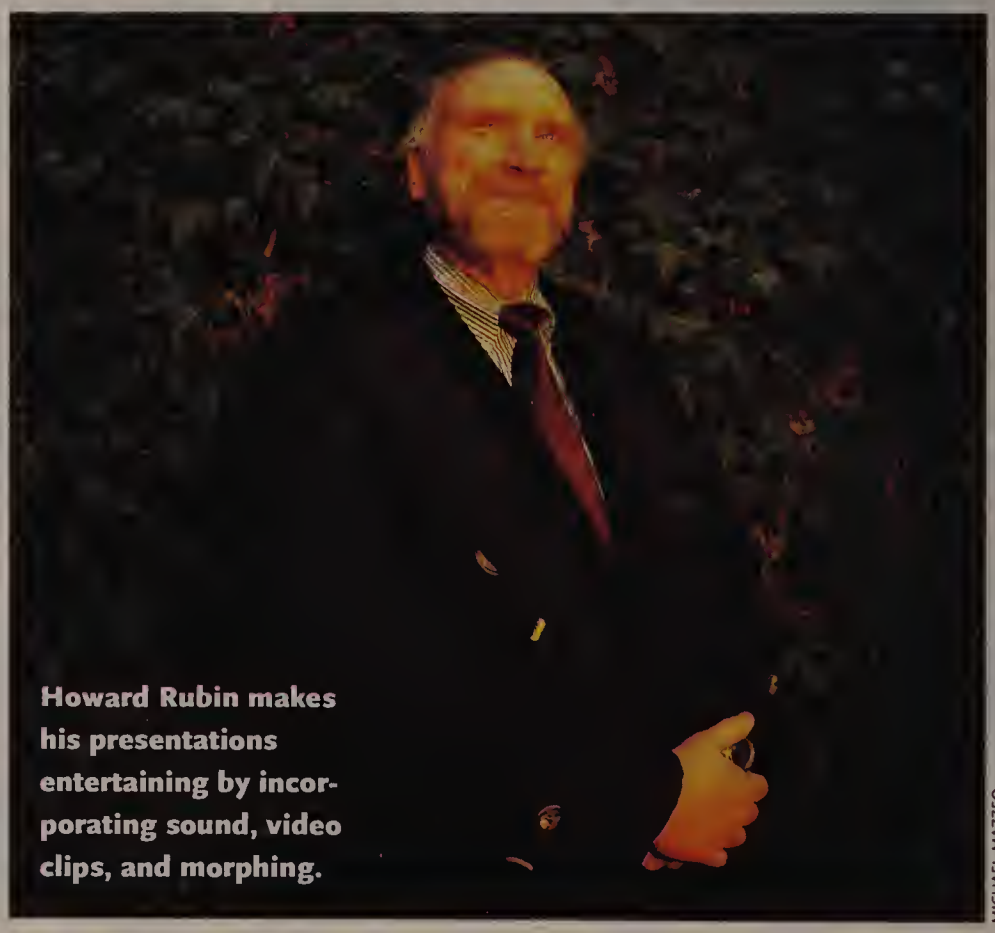
Rubin's predilection for hopping between files as the situation warrants is echoed by another master presenter, Jo-Anne Dressendofer, founder and president of Morristown, N.J.-based Imedia Inc. "Presentation content is getting less and less linear," she explains. "In order to tailor what you're doing do the particular audience you're in front of, you need to be able to navigate at will through whatever content 'modules' are at your disposal."

Dressendofer has a particularly strong motivation to make her presentations compelling and sophisticated, since her technology marketing firm is often called on to develop presentations for her blue-chip clients as well. But with a strong graphics team to back her up, Dressendofer can quickly produce a high-impact pitch that's custom-made for the prospect at hand. Her presentations often include personal testimonials by top executives from high-profile clients such as AT&T Solutions and Lucent Technologies. Those testimonials have a much more powerful effect on a prospect than just dropping some famous names on a bullet list. "It really says something about your relationship with a client when you can show them making personal statements about how they value your service," Dressendofer declares. "And it allows you to avoid making a lot of self-serving statements about how great you think you are."

ALREADY ON THE JOB

A key aspect of Dressendofer's approach during a sales pitch is to give the prospect the feeling that her firm is already actively working for them. She'll do that by having plenty of customized content in her presentation, going as far as snapping a picture of the prospect's corporate headquarters with a digital camera and putting it on the title graphic. "During the time you're with them, they have to believe that all you care about is them," she says. "That's why most of our content is about them, not about us."

In fact, Dressendofer believes that a successful pitch is one that



Howard Rubin makes his presentations entertaining by incorporating sound, video clips, and morphing.

MICHAEL MAZZEO

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"The tools are there to give anyone building a presentation the power of a television producer."
—Howard Rubin, Meta Group

segues seamlessly into an active consulting engagement right on the spot. That's why she often arranges to have a variety of subject-matter experts ready to be teleconferenced into her presentations at a moment's notice. "With the kind of time pressure clients are usually under, it just doesn't make sense to go through a whole presentation cycle and then try to get people together to initiate the engagement sometime later," she explains. "We add value by making the expertise the client needs available at the point they need it, even if it's in the middle of a presentation."

Dressendofer also uses this technique when speaking at conferences or other large groups. "Teleconferencing technology has evolved to the point where you can have multiple participants on the line and allow audience members to ask them questions directly," she says. "That makes for a much livelier, more interactive session and makes your role more that of an orchestrator than a self-styled expert."

In addition to customizing content based on the particular purpose of the presentation, Dressendofer advises presenters to consider the specific venue as well. "If you're in a small room, then you're the focus and the visuals are a supplement," she notes. "But if you're in a hall, you're nothing and the screen is everything. That makes a big difference in how you're going to use your content during the talk."

ALL IN ONE PLACE

Because she has wrestled with managing a wide range of presentation content that often resides in many different places, Dressendofer decided to develop a service to help her clients with the same issues. So, in

Mastering Multimedia

Here are some ways to enliven your presentations with images and sound

Graze the Web for content. There are all kinds of photos and movie clips available on news and entertainment sites and industry-specific pages. A quick E-mail to the webmaster can secure permission to use these materials for a presentation, as long as you make it clear you won't be reproducing the material for profit.

Know your pipe. Remember, if you're going to go online live during a presentation, there's a difference between the dial-up connection you may use at the presentation site and the T1 line you have back at the office. So be prepared for greater delays, especially for graphics-laden Web pages.

Morphing is fun. Today's morphing tools are easy to use and can connect any two images. Want to tell your audience that your product can make them lots of money? Morph a picture of it into a large stack of $100 bills.

Humor is fun, too. People respond better to your message if they know you're a people, too. So lighten things up and don't be afraid to poke fun at yourself. Get a video clip of a boar and warn your audience to be prepared for another "boar-ing" presentation.

Sound thinking. Sounds can be as effective as visuals. Imagine asking your audience a question and then playing the theme from "Final *Jeopardy*." Or making a point and then having a recognizable celebrity voice echo agreement. Moments like that let your audience know you value their time, because you obviously put time into your presentation.

Be prepared. One point all experienced multimedia presenters agree on: Always be prepared to fly solo. Things can go wrong, so your presentation has to work without any of your nifty clips and tricks. Remember, the show must go on! ✱

If a 6.8 pound projector can influence the entire computer industry, imagine what it can do for your meetings.

Why would PC Magazine rank a humble projector company among the likes of Intel, Microsoft, and the other most influential companies in the computer industry? Good question. They said it's because In Focus is changing the way people use technology; more and more people are projecting from their laptop PCs, making the most of their meetings. They also said it's because of projectors like our revolutionary new 6.8-pound personal series—the ones that earned In Focus an Editors' Choice Award and made us the only projector company on the list. Our personal projectors are so small and so bright, you can project with the lights on. They've become the preferred choice of people everywhere who present on the road. And we've got a full line of industry-leading projectors for conference rooms and fixed installations, too. So for projectors that are affordable, reliable, and just plain make you look great, there's really only one choice. The number-one name in projectors—In Focus.® It's your image. Project yourself.™ To arrange a free demo, simply call 1-800-294-6400. Or visit us at: www.infocus.com/pwd

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part 2 STAND & DELIVER

"We make sure clients are always only a click away from whatever they need, even if they're in a hotel room working late the night before a big presentation." —Jo-Anne Dressendofer, Imedia

addition to gaining access to her digital design team's skills, clients who sign on with Dressendofer's firm also get to tap into a customized online content repository. Dubbed the Imedia Virtual Marketing Center *(www.imedianet.com)*, this service creates a single source for all the multimedia content a client needs to put together great presentations on the fly. "A lot of times the problem people have is that they don't know where to get all the different content that's already been developed for them," Dressendofer observes. "By putting everything on a secure, well-organized Web site, we make sure clients are always only a click away from whatever they need, even if they're in a hotel room working late the night before a big presentation."

Dressendofer is also big on giving her audience hard copy materials during her presentations. "Supposedly that's a big no-no, since it takes attention away from you," she admits. "But printed material creates another point of contact with your listener and gives them something of yours to take their notes on. Once they start doing that, they start to take ownership of the material and personalize it, which is your objective."

She also reminds presenters that, with all the technology and content that can now be thrown at an audience, it's critical not to forget the most important presentation skill: listening. "It's easy to get so wrapped up in what you want to put across to your audience that you lose sight of their real needs," she warns. "That can be fatal, especially if your goal is to establish a working relationship."

So what does the future hold for these podium potentates? According to Rubin, the next step in multimedia presentation technology will involve 3-D visualization of data. "What I'm looking forward to is being able to actually 'fly' my audience through the material," he muses. "It's going to be like a virtual city, where you can go down different streets and look at different things, depending on what it is you want to know."

Whatever Rubin's virtual city ends up looking like, one thing's for sure. It will be a safe one, because you won't encounter any stray bullet points. ✱

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POWERLITE 7500C

Epson

If you're looking for a high-performance multimedia projector that's light enough to carry wherever you need to go, then consider the Epson PowerLite 7500C. At 9.3 X 13.6 X 3.7 inches and just 9.4 pounds, the 7500C truly earns the title "ultra-portable." With 800 lumens of light-power and a 300:1 contrast ratio, the 7500C projects a clear image in all

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HiFD

Sony

Sony, the company that developed the 3.5-inch floppy disk back in 1980, now introduces the HiFD drive, a high-performance storage solution that delivers 200 MB of reliable diskette capacity. In addition to giving you plenty of room to store large amounts of multimedia content, the

HiFD drive also boasts a data transfer rate of up to 3.6 MB/sec. That's around 60 times the speed of a conventional floppy drive. The HiFD system is built to resist wear and tear and implements a sophisticated error-correction scheme to maximize media reliability. HiFD drives are fully compatible with existing floppies.
www.sony-hifd.com

LP SERIES

In Focus

In Focus offers a complete line of data/video projectors. From the 6.8-pound LP400 personal projector to

the LP750 High-Bright conference room model, In Focus products are designed to let you focus on your presentation instead of your equipment. Auto-Sensing electronics instantly identify your video signal and calibrate the picture for you. Super-quiet operation ensures that your audience won't be distracted. Texas Instruments' advanced Digital Light Processing™ (DLP) technology provides bright colors, crisp contrast, and film-like video playback. Plus, In Focus projectors are remarkably affordable.
www.infocus.com

G90

Sony

Sony Electronics has distilled its years of experience in display technology to produce the G90, a high-resolution CRT projector that can transform any conference room or

meeting facility into a multimedia theater. The G90 can easily accommodate full-motion video or static graphics, and it can accept a wide range of input sources, from notebook PCs to HDTV devices. The G90 also features Sony's unique Digital Reality Creation™ (DRC) feature, which doubles the number of scanning lines and pixels on each line, resulting in images with four times the density of conventional projectors.
www.sony.com/professional

PHENOM EXPRESS

LG Electronics

Road warriors who are tired of lugging around a full-sized notebook will welcome LG Electronics' 1.8-pound Phenom Express handheld PC. The Phenom Express sports 32MB of RAM, an 8 1/8-inch diagonal display, and a built-in 56Kbps modem. Best of all, the Phenom Express is

equipped with a standard-sized VGA port. You can run PowerPoint through any standard VGA-capable device, without having to worry about special adapters. The Phenom Express is powered by the Windows CE operating system, and comes preloaded with the software every mobile presenter needs, including Microsoft Pocket Office, Pocket Outlook, and Pocket Explorer.
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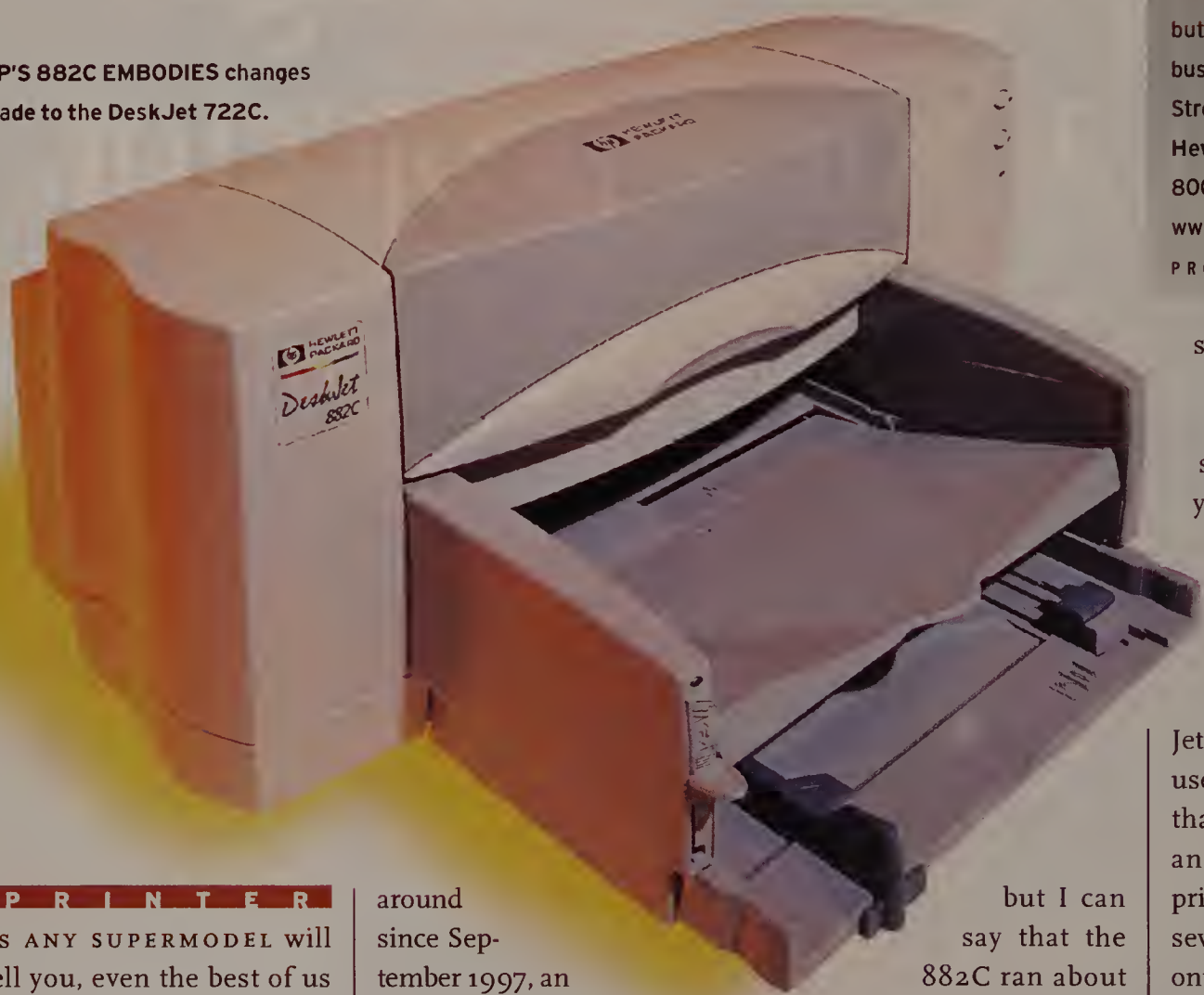
NEW PRODUCTS

HP DeskJet 882C: Two Steps Forward, One Step Back

HP'S 882C EMBODIES changes made to the DeskJet 722C.



HP DeskJet 882C

PRO: Gorgeous photo output, good printing speeds.

CON: Text quality is inconsistent and can look somewhat fuzzy.

VALUE: Good choice for home use, but text quality isn't always up to business standards.

Street price: $299

Hewlett-Packard

800/752-0900

www.hp.com

PRODUCT INFO NO. 719

PRINTER

AS ANY SUPERMODEL will tell you, even the best of us can use a nip and tuck here and there. Occasionally, however, something goes awry during the makeover, rendering, say, a nose a skosh too narrow. A similar surgical slipup appears to have affected Hewlett-Packard's hugely popular DeskJet 722C, possibly the best-selling ink jet printer ever. The 722C didn't need any improvements—it printed beautiful colors, quickly and quietly—but it's been around since September 1997, an eon in computer years. Now comes its replacement, the more expensive and faster **DeskJet 882C**. So what's not to like? HP surprised us with inconsistent text quality.

FASTER THAN EVER

BUT FIRST, consider the improvements. HP claims big speed increases for the DeskJet 882C over the 722C. My informal tests can't officially verify the company's claims, but I can say that the 882C ran about 25 to 35 percent faster than the 722C on individual documents—a significant increase. For many people that's a real boost in productivity. The shipping version I evaluated delivered a page of text in under 20 seconds, a page of mixed text and graphics in a little over half a minute, and a full-page photograph in about a minute and a half.

Other enhancements come in the 882C's connectivity and software. In addition to its conventional parallel port connection, a new Universal Serial Bus port allows you to hook a string of peripherals—such as another printer, scanner, and removable storage drive—to a computer all at the same time. The DeskJet 882C also has two mildly useful new software features that let you print handouts and posters. With handout printing, you can consolidate several pages of a document onto a single page, while poster printing expands an image, dividing it over several pages.

COSMETIC SURGERY

IN MOST WAYS, the 882C is neither better nor worse than the 722C, which is more of a compliment than it sounds. The two models look about the same, with sleek, curved sides, and interiors that are easy to access. The 882C purrs quietly, as the 722C did. And like the 722C's printed manual,

the 882C's is short but clear, and its online documentation is comprehensive.

Unfortunately, the $299 882C may frustrate some users with inconsistent print quality. Whereas the $249 722C produced crisp text and luscious photographs, the 882C's text looked alternatively crisp and fuzzy in our tests, depending on the document's font and font size. For most home users and some business users, perfect text isn't necessary; however, small offices are better off looking elsewhere for business-quality type. To its credit, the 882C yields realistic photographs on plain paper and lush ones on HP's premium photo paper ($10 for 15 sheets of 8.5-by-11-inch paper).

If you want good-looking color prints and care less about text quality, the HP DeskJet 882C offers a delicate refinement to the 722C.

—*Karen Silver*

CONTENTS

78 HP DeskJet 882C printer
79 Dell Latitude CPi A366XT notebook PC
80 WinBook XL 300 TFT laptop, ATI Rage Fury graphics card
84 Microsoft Works Suite 99, Complete Publisher '99
88 NTI Backup Now utility, Iomega Clik storage drives
90 Jazba desktop publisher, WebRacer touchpad
92 Compaq TFT8000 LCD panel, SGI's Digital Flat Panel Solution Pack; PageKeeper Pro 3.0 document manager
94 Simply Postage, Stamps.com
100 Model 88 table radio, Sony FVP-1 Mavica Photo Printer
102 **SPOTLIGHT** CTX Opto EZPro 585, InFocus LP400, Proxima UltraLight LS1, and Sony VPL-SC50U projectors

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Dell's New Latitude Packs Attitude

NOTEBOOK

AS COMPUTER makers continue to reinvent their products in ever-shorter cycles, Dell's Latitude CPi notebooks have survived by evolving steadily and successfully.

Dell's decision to stick with each successive Latitude CPi design and configuration for an average of 15 months, and to give its notebook computers backward and forward component compatibility, is specifically designed to please large-volume corporate buyers. The latest Latitude, the $3248 CPi A366XT, is a case in point.

LOADED, NOT BLOATED

EQUIPPED WITH the Pentium II-366—Intel's fastest mobile processor—along with 64MB of memory, a 6.4GB hard drive, and a 13.3-inch active-matrix screen, the shipping model I looked at is remarkably similar to the well-respected **Latitude CPi D300XT**. That notebook's quick performance, thin 1.5-inch profile, comfortable keyboard, and high system reliability earned it a top spot on our *Top 10 Notebook PCs* power chart for many months.

LOW-LIFE BATTERY

AT 7 POUNDS, the new CPi is about 4 ounces slimmer than its 300-MHz predecessor. The top part of the screen frame no longer juts out beyond the rest of the notebook's case, a design flaw that jeopardized the display. And the laptop's outstanding PC WorldBench 98 score of 184 is more than 15 percent higher than that of the D300XT. This significant increase in performance places the A366XT in the company of the fastest notebooks that we have evaluated to date. Our initial battery test produced an abnormally low 1.8-hour score, presumably due to a notebook defect. We tested another identical A366XT and this time got a rating of 2 hours and 10 minutes—still nearly an hour short of the D300XT's score.

You pay a premium of a few hundred dollars over the price of other notebooks to get the Latitude CPi's configuration stability. You also sacrifice some of the newer features that are available on competitive brands—for example, a DVD-ROM drive won't be an option until sometime later this year. But for corporate buyers who are hoping to standardize on one type of portable computer, the Latitude CPi's resistance to change should come as a big relief.

—*Vince Bielski* ▶

Dell Latitude CPi A366XT

PRO: Thin and light, very fast, excellent keyboard, platform stability.

CON: A tad pricey, no DVD-ROM drive option at this time, hard drive removal requires screwdriver, no internal modem available.

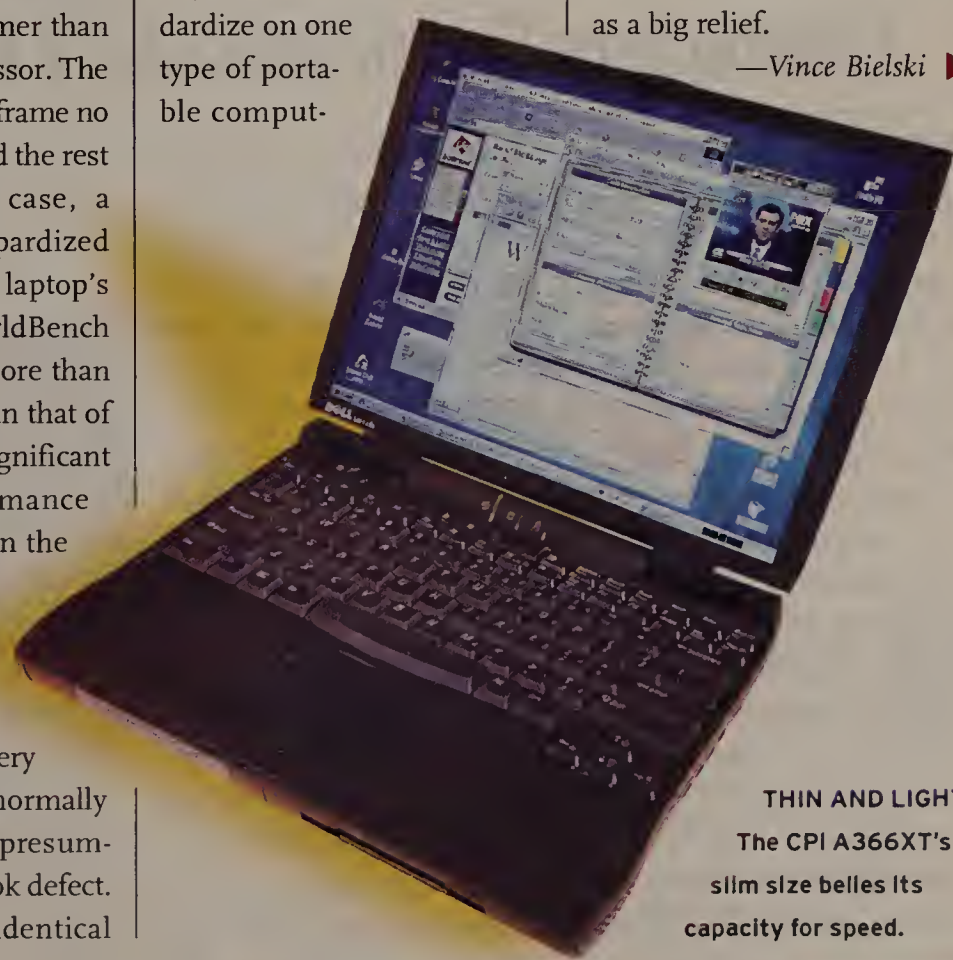
VALUE: Light enough for travel, powerful enough to use as a desktop replacement.

Street price: $3248

Dell

800/388-8542

www.dell.com



THIN AND LIGHT: The CPI A366XT's slim size belies its capacity for speed.

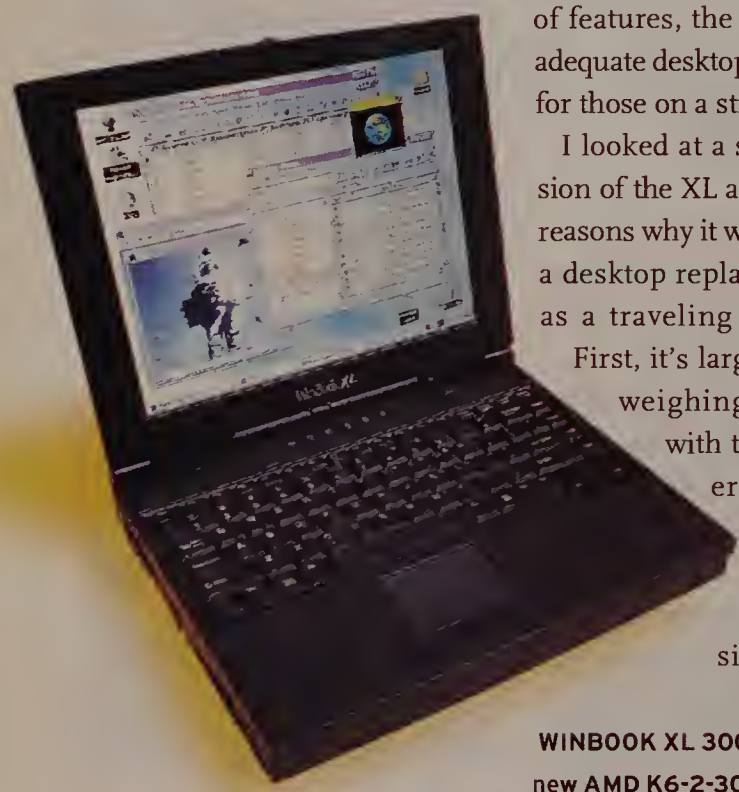
PHOTOGRAPH: KEVIN CANDLAND

WinBook XL 300 Works Hard for the Money

NOTEBOOK

FOR INTEL-LIKE speed at a budget price, it usually pays to look for AMD inside. WinBook's $1399 **XL 300 TFT**, the first notebook to ship with AMD's new K6-2-300 mobile chip, confirms this dictum. With a PC WorldBench 98 score of 135, it performs as well as a Pentium II-233 notebook and costs about $300 less. Although it lags behind most PII-233 laptops in terms of features, the XL 300 is an adequate desktop replacement for those on a strict budget.

I looked at a shipping version of the XL and found two reasons why it works better as a desktop replacement than as a traveling companion. First, it's large and heavy, weighing 8 pounds with the AC adapter. Part of that heft can be attributed to the inclusion of both a fixed floppy drive and an 8X–20X CD-ROM drive. Second, the boxy unit's single battery is nickel–metal hydride, an older technology that allows fewer recharges than today's standard lithium ion batteries. Like most sub-$1500 laptops, this WinBook is available only with a 12.1-inch active-matrix screen and a 2GB hard drive (small by today's standards).



WINBOOK XL 300 TFT uses the new AMD K6-2-300 mobile chip.

In the XL's favor, the NiMH battery offers a decent life of 2 hours and 50 minutes. The big touchpad-equipped keyboard gives touch typists plenty of room to stretch out and fly. A V.90 56-kbps modem is built in, and the XL connects to WinBook's optional $99 port replicator, making it easy to use as your primary PC. WinBook also sells an $1199 version of the XL with a dual-scan screen and Intel's new Pentium MMX-300, a slower chip than AMD's K6-2-300.

At press time, another new AMD mobile CPU, the K6-2-233, was due to appear in two Toshiba notebooks, the $1699 Satellite 2540CDS and $1999 Satellite 2545XCDT. Their introductions mark the first time Toshiba has sold a mainstream portable equipped with an AMD chip in the United States. Both notebooks are aimed at small-businesses and home users. —*Carla Thornton*

WinBook XL 300 TFT

PRO: Acceptable performance for the money; big, comfortable keyboard; decent battery life.
CON: Portly, no bundled apps.
VALUE: An inexpensive desktop replacement.
Street price: $1399
WinBook
800/725-3470
www.winbook.com
PRODUCT INFO NO. 722

PHOTOGRAPH: KEVIN CANDLAND

A Blisteringly Fast Graphics Card From ATI

GRAPHICS CARD

BASED ON ITS impressive technical résumé, ATI's new **Rage Fury** graphics board seems perfect for 3D gaming and high-end graphics applications. Equipped with a whopping 32MB of SDRAM, this power-pumped card supports monitor resolutions up to 1920 by 1200. It also offers comfortable refresh rates of up to 85 Hz—great news for users who work regularly with large spreadsheets or diagrams.

Thanks to Rage Fury's full-screen, hardware-integrated DVD support, you no longer need an additional MPEG-2 decoder board to view DVD movies on your PC, which saves you a valuable slot space. And with its included video-out connector, you can view those DVD movies and 3D games on your television.

Unfortunately, the preproduction board I tested with its beta software drivers suffered from some rendering and visual-quality gaffes. For instance, it crashed our system when running a PowerPoint test that uses 3D clip art. When we played 3D games such as Turok Dinosaur Hunter, fog effects and transparencies appeared banded and too thick. Similar problems occurred with Redline Racer, in which the background sky and a motorcycle's headlights looked banded and dithered.

So what's causing all those problems in such a powerful graphics card? Buggy drivers appear to be the main culprit. ATI promises to have them fixed by the time you read this review. For more peace of mind, consider that the vendor offers a five-year warranty.

Preproduction problems aside, the Rage Fury's future looks promising. It costs $199, a good price for the power and features you get. Whether it'll smoke other graphics cards on our *Top 10 Graphics Boards* chart remains to be seen, but based on the speed results from our tests here, it looks like a strong contender.

—*Grace Aquino* ▶

ATI Rage Fury

PRO: Scorchingly fast; produces rich, colorful images; offers a TV-out port and integrated DVD support.
CON: Poorly rendered 3D graphics.
VALUE: Assuming its driver problems are resolved, this is a well-priced choice for gamers and users of business graphics.
Street price: $199
ATI Technologies
905/882-2600
www.atitech.ca
PRODUCT INFO NO. 720

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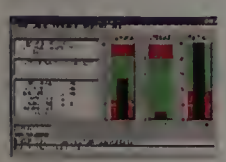

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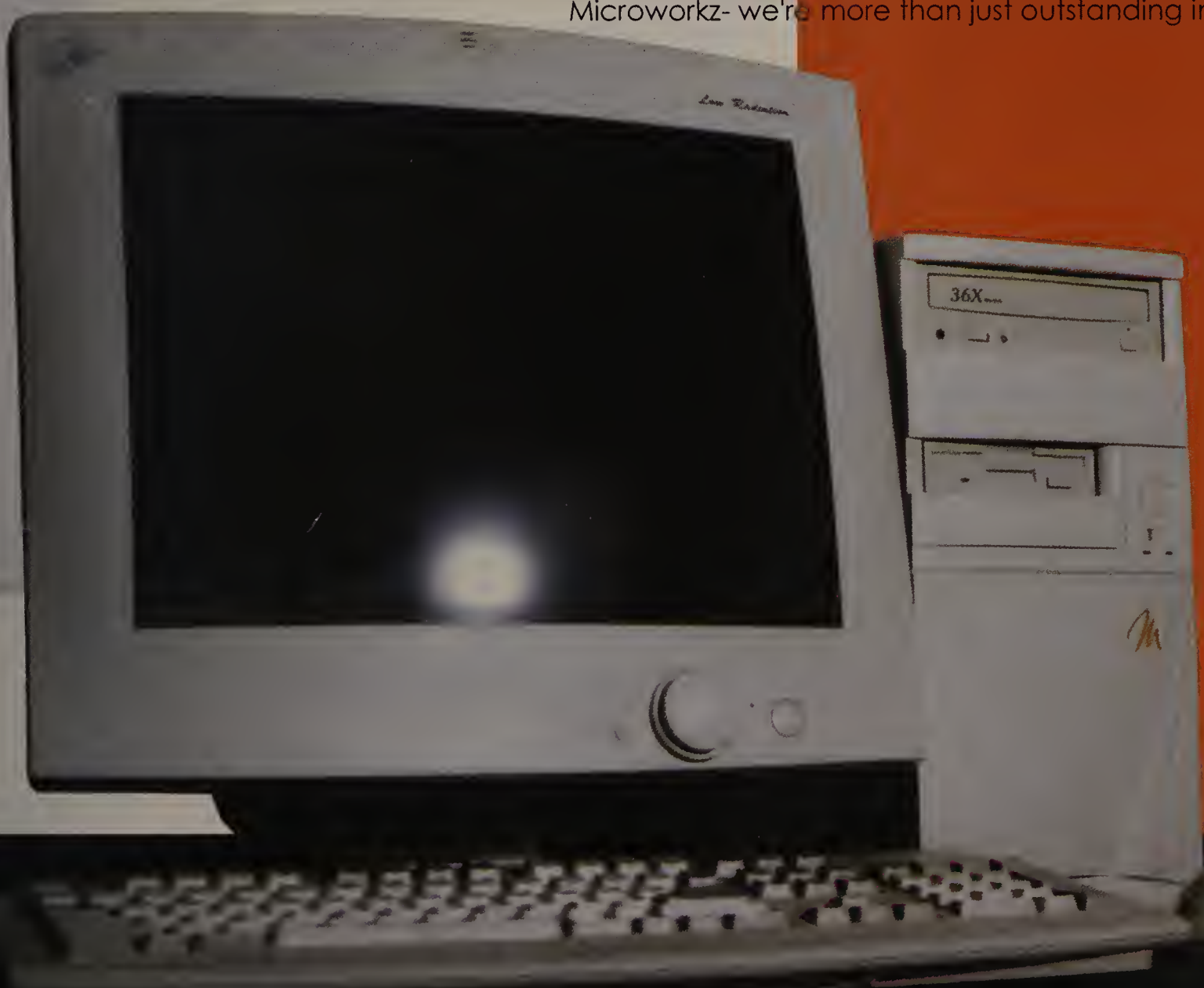

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Microsoft Works Suite: Big Bundle, Little Price

OFFICE SUITE

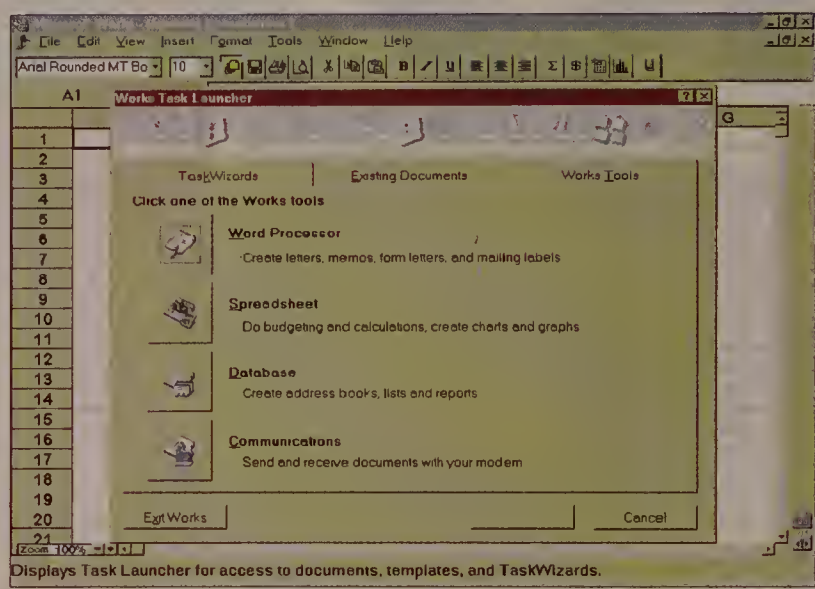
MICROSOFT CLAIMS that you can run a small business using **Works Suite 99**, but doing so would be like commuting on a tricycle. Its main application, Works 4.5—an integrated word processor, spreadsheet, database, and communication package—lacks the robust feature set of its professional sibling, Microsoft Office. But for the home user with simple needs, there are still two very good reasons to buy Works: It is wondrously free of the feature bloat that afflicts so many other graybeard applications, and, quite simply, it works.

In addition, Microsoft has bundled its powerhouse word processor, Word 97, the most popular app in Office, to bolster the rather lame word processing capabilities of Works 4.5. The shipping version of the $99 package I tested also includes Microsoft's Works Calendar, Money 99 Basic, Encarta Encyclopedia 99, Graphics Studio Greetings 99, Expedia Streets 98, and the Internet Explorer 4.0 browser and Outlook Express e-mail client.

Overall, Works 4.5's spreadsheet is basic, the database is flat-file, and the communications applet shows its primitive DOS roots. Still, the integration of Works 4.5's four components lets you facilitate a mass mailing, say, by merging in the word processor a list of addresses entered in the database. A chart created from figures in a spreadsheet can be added to a document with just a few mouse clicks. And all four components are accessible from a single tab on the main Task Launcher folder.

Considering that Word 97 costs $85, Works Suite 99 with its cornucopia of software is well worth the extra $14. It even qualifies for an upgrade to Office 2000, which will save you about $150 over the nonupgrade price.

—Dennis O'Reilly



MICROSOFT WORKS 4.5'S FOUR COMPONENTS are easily accessible from a single tab on the main Works Task Launcher folder.

Microsoft Works Suite 99

PRO: Simple, functional, integrated; you get Word 97 and a host of other productivity applications at a bargain-basement price.

CON: Communications functions are now integrated components of Windows; spreadsheet lacks Excel's business tools.

VALUE: If you want Word 97, this bundle is a great value.

Street price: $99

Microsoft

800/426-9400

www.microsoft.com

PRODUCT INFO NO. 702

Publisher '99 Pushes Power Over Content

DESKTOP PUBLISHING

SIERRA'S **Complete Publisher '99** can't compete with desktop publishing behemoths like PrintMaster Platinum and PrintShop Publishing Suite when it comes to content. Its three CDs offer only about 30,000 graphic images (PrintMaster has over 100,000) and 1500 business templates for everything from newsletters and coordinated letterhead sets to Web pages. But what the publishing package lacks in content, it makes up for in power and ease of use.

The suite's core program—Micrografx's powerful Windows Draw 7—comes with 30 professional drawing and design tools, and makes it easy to design freehand or customize 1500 ready-made templates. It also provides backgrounds, icons, buttons, and animations for creating any kind of Web site. The suite includes copies of Photo Magic, a basic photo editor, and Instant 3D, a graphics tool that offers about 100 3D wire frame images to which you can apply textures and lighting effects.

An easy-to-use interface supplements these powerful tools. Whether you're making a simple "for sale" sign or a multilayer document with drawings, photos, and 3D objects, the Visual Toolbar will walk you through the process. Any project you create can be saved in HTML and used as a Web page. You can, for example, turn a customized company calendar into an HTML table for the company Web site in just a few steps.

At $120, Complete Publisher '99 is rather pricey (PrintMaster Platinum is $60 and PrintShop Publishing Suite is $70). But it offers graphics novices the tools to create professional-looking printed and electronic materials.

—Angela Navarrete ▶

Complete Publisher '99

PRO: Bundled Windows Draw 7 from Micrografx adds power to an easy-to-use graphic tool set.

CON: Has fewer ready-made graphics and pieces of clip art than comparable packages do.

VALUE: People of all skill levels can use the suite to create a variety of custom materials, from letterheads to Web pages.

Street price: $120

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COMPAQ

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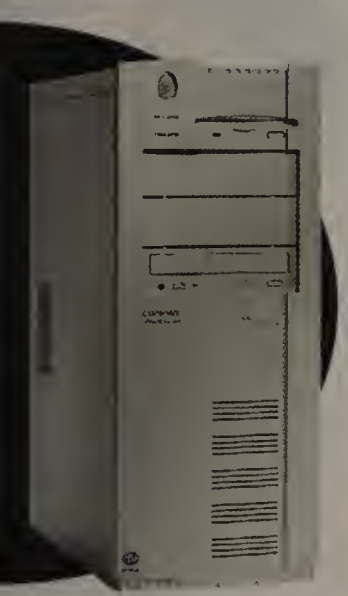

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Use Your CD-R Drive to Make PC Backups

BACKUP

IF YOU THINK today's multigigabyte hard drives are just too big to back up anymore, think again. Most hard drives today hold 4GB or more of data, making the once seemingly bountiful 100MB Zip drives and glacierlike 2GB tape drives inadequate for full backups.

Enter **NTI Backup Now**. This $70 utility from NewTech Infosystems lets you use any CD-Recordable drive to make unattended backups to a CD-R disc. I tested a shipping version. Unlike backing up to a writable CD, which is a painstaking hands-on process, NTI Backup Now allows you to save, with little effort, more than 800MB of compressed files and apps on a single 650-MB disc and have quick access to restore them. And unlike magnetic media (like Zip discs and tapes), CDs aren't vulnerable to stray electronic signals.

NTI Backup Now combines the best elements of other backup utilities. You use a simple Explorer-like interface to select the data you want to back up. You can also create custom settings that will let you back up entire folders or even whole drives—and NTI Backup Now will tell you how many discs you'll need.

Using the Recovery CD feature, you can make a backup of your Windows folder, which you can save on a floppy and use to start up a crashed system. You can also compare the files on the CD to those on your hard drive and save only new files or those that have changed since the last backup.

But recording data on a CD can be tricky. Even on the fastest machines, you can't run any other program while the hard drive is recording—or risk burning a coaster. Fortunately, you can easily schedule a backup time, say, in the middle of the night, leaving a blank disc in the CD tray.

Recordable CD drives aren't as common as Zip drives for backing up data, but if you already have a CD-R or CD-RW drive, NTI Backup Now is a great alternative.

—Andrew Brandt

NTI Backup Now

PRO: Backs up large volumes of data easily to 650MB discs, works unattended.

CON: Must be the only application running to avoid errors.

VALUE: An easy way to make regular archival backups.

List price: $70

NewTech Infosystems

949/622-6970

www.ntius.com

PRODUCT INFO NO. 704

Iomega Clik Offers Small size, Large Storage

REMOVABLE STORAGE

IOMEGA REVOLUTIONIZED removable mass storage technology with its 100MB and 250MB Zip discs. Now the company aims to repeat history with its matchbook-size, biscuit-thin 40MB Clik disks.

Announced nearly two years ago, Clik is just now arriving in stores. The $10 disks look and act like miniature hard drives and are designed primarily for use with digital cameras and driveless handheld PCs. Clik will replace the more expensive and inconvenient CompactFlash cards currently used by most digital cameras. The first cameras with Clik built in should appear this summer. But based on my use of a shipping version of a low-end **Iomega Clik Drive**, I'd wait at least until then before buying one of these devices.

The Clik Drive for Mobile Computers I tested is a little bigger than an audiocassette. It fits into a desktop caddy that connects to your PC's parallel port via a bulky device with a pass-through port for your printer and an input for the AC power adapter. To transfer my digital camera images to the Clik, I had to take the drive out of the desktop caddy, plug in the included flash memory reader, and stick in the flash card or smart disk media. The files were automatically copied from the flash card to the Clik drive. Then I removed the reader, put the Clik drive back in the caddy, and transferred the contents to my PC's hard disk. I could accomplish the same job with one less step using a flash memory reader such as ActionTec's $79 parallel port Camera Connect Pro.

MATCHBOOK-SIZE Clik disks hold 40MB of data, read by this parallel port drive.

Other hassles: Clik cannot coexist with any other parallel port device, like Iomega's Zip drives, or even some printers, such as my Canon BJC-80. When connecting to Windows CE handhelds via a PC Card slot, Clik's PC Card interface requires AC power to run, so it is unsuitable for use on the road.

Finally, the drives are somewhat pricey: The low-end Clik Drive for Mobile Computers sells for $199; a digital camera bundle with flash card reader goes for $249; and the premium Clik Drive Plus, combining the mobile and digital camera bundles, costs $299. Given the devices' expense and setup hassles, I'd have to say the Clik doesn't click. *—Michael S. Lasky* ▶

Iomega Clik Drives

PRO: Lightweight 40MB storage alternative for digital cameras and handheld PCs, with low-cost disks.

CON: Finicky parallel port connection, AC adapter needed.

VALUE: Worth the inconvenience only if cheap media is a must.

Street price: $199 to $299

Iomega

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www.iomega.com

PRODUCT INFO NO. 705

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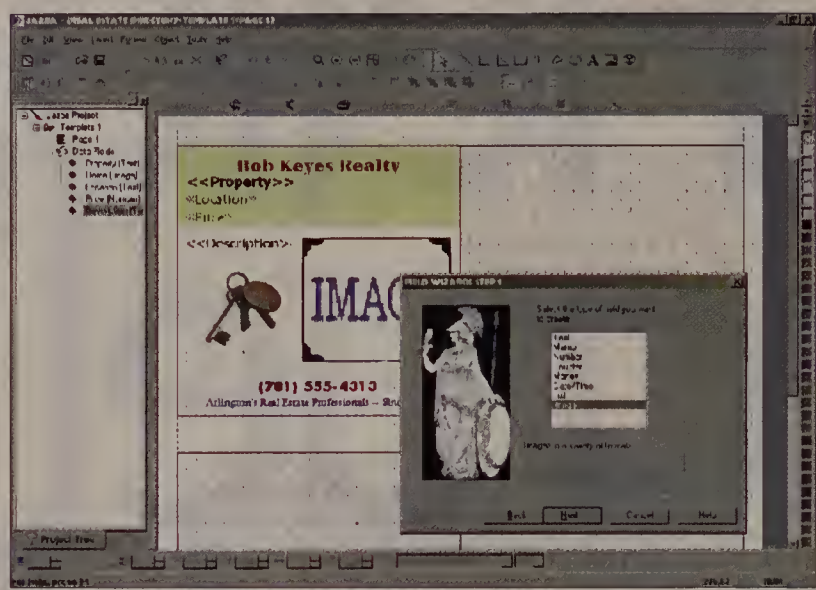
All That Jazba: A Unique Desktop Publisher

DESKTOP PUBLISHING

FROM PRODUCT catalogs to real estate listings to employee directories, many desktop publishing documents consist of small, frequently changing nuggets of information presented in a standardized format. Part desktop publisher and part database, Techlogix's **Jazba** lets you create and update such documents easily. I tested a prerelease version of this $99 software package.



JAZBA LETS YOU FILL a publication, such as this real estate catalog, with information drawn from its built-in database.

If the information you want to publish already exists in an Access database, Jazba can import it directly (it can import from others as a CSV file). You can also enter records into Jazba's own spreadsheet-style data manager. Using the program's layout tools, you create a template to hold one record—say, a product listing. Jazba then repeats the template across multiple pages, filling them with records from the data manager. Afterward, you don't need to fiddle with the layout when information changes (for instance, when a product goes up in price). Just add, delete, change, or rearrange records in the data manager, and Jazba automatically updates the publication.

Techlogix says Jazba's shipping version will include about 40 ready-made designs for projects such as catalogs, property inventories, and family albums. But advanced users will likely find the package's formatting tools too spartan: For example, you can't define custom text styles or adjust line spacing. And while you can save documents in HTML format, you'll probably want to dress them up in a Web editor before putting them on your site. Even with these limitations, Jazba's unique capabilities make it worth a look.

—Harry McCracken

Jazba

PRO: Creates catalogs, directories, and similar publications.

CON: Could use more sophisticated formatting and Web publishing tools.

VALUE: Solves common updating problems at a fair price.

List price: $99

Techlogix

508/485-1496

www.techlogix.com

PRODUCT INFO NO. 706

WebRacer Puts Web Control in Your Hand

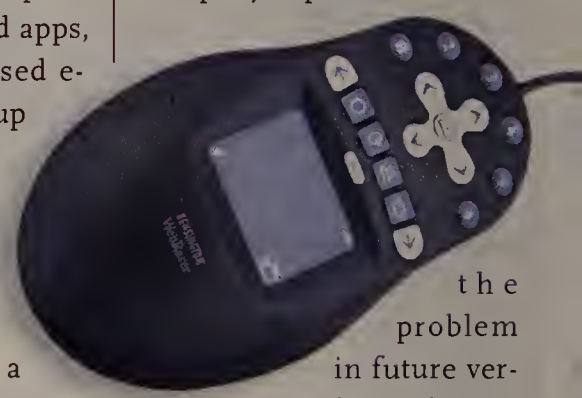
INPUT DEVICE

TIRED OF mousing around? I am. You have to keep mice free of crumbs, they eat valuable real estate, and they make my hand hurt. But none of the touchpads I've tried beats my Intellimouse—though Kensington Technology's $60 **WebRacer** comes close.

As its name implies, the WebRacer was designed with the Internet in mind. It has the responsive touchpad you need to work in any program, and a feature set that makes Web surfing faster and easier.

The black, shoe-shaped device is loaded with 13 small buttons, four arrow keys, four large mouse buttons, and a touchpad screen. Six of the buttons function like the programmable presets on a car radio. To set them, you simply hold down a button while at a site. Other buttons mimic the back, forward, stop, and reload commands of a browser. And still others call up the print dialog box in standard apps, launch your Web-based e-mail client, and bring up your bookmarks.

One problem: In my test of a shipping version, the autoscroll feature worked inconsistently. In theory, a small amount of pressure on the edge of the touchpad is supposed to let you scroll horizontally or vertically. And while that feature worked in major browsers, scrolling in other programs such as Word and Lotus Notes was hit-and-miss. Kensington says the difficulty stems from trying to program the device for both Microsoft and non-Microsoft productivity applications. The company expects to resolve the problem in future versions of the software.



Despite this flaw, WebRacer is a sensitive touchpad whose customization features make it convenient to use, especially on the Web.

—Bill Snyder ▶

WebRacer

PRO: Responsive, lots of easy-to-program buttons.

CON: Scrolling can be quirky depending on the application.

VALUE: Works fine for Web-based tasks but is less suitable for heavy text editing.

Street price: $60

Kensington Technology Group

800/280-8318

www.kensington.com

PRODUCT INFO NO. 707

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	VisionMaster Pro 501 (19.5" VIS)	TCO '95	0.28mm/AG	96khz	1600 x 1200@75hz	$939
	VisionMaster 502 (19.5" VIS)	TCO '95	0.27mm/dp	110khz	1800 x 1440@75hz	$999
	VisionMaster 501 (19.5" VIS)	TCO '95	0.27mm/dp	96khz	1600 x 1200@75hz	$939
19"	**VisionMaster Pro 450** (18.0" VIS)	TCO '95	0.25mm/AG	115khz	1800 x 1440@80hz	$699
	VisionMaster 450 (18.0" VIS)	TCO '95	0.26mm/dp	102khz	1600 x 1200@80hz	$599
17"	**VisionMaster Pro 400** (16.0" VIS)	TCO '95	0.25mm/AG	96khz	1600 x 1200@75hz	$469
	VisionMaster 400 (16.0" VIS)	TCO '95	0.26mm/dp	96khz	1600 x 1200@75hz	$409
	S702GT (16.0" VIS)	TCO '95	0.28mm/dp	96khz	1280 x 1024@85hz	$369
15"	**VisionMaster 350** (13.7" VIS)	MPR-II	0.28mm/dp	69khz	1280 x 1024@65hz	$209

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Six Time Winner
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VisionMaster Pro 21

PC MAGAZINE EDITORS' CHOICE
October 7, 1997
VisionMaster Pro 17
October 6, 1998
VisionMaster 450

WINLIST 1998
September 1998
VisionMaster Pro 502

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VisionMaster Pro 17
April 1998, August 1998
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PCComputing
December 1998
VisionMaster Pro 450

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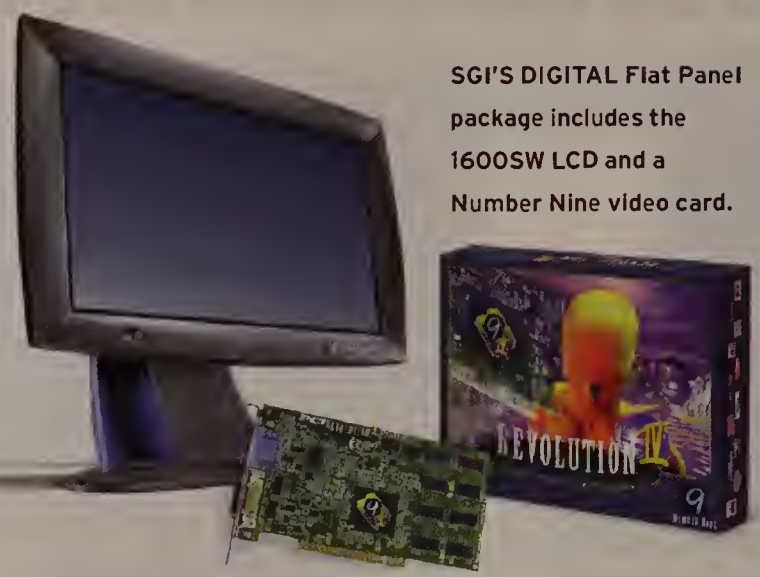
Pixel Envy: LCD Panels Get Bigger

MONITORS

IN THE REALM of LCD flat panels, progress means sleeker and slimmer designs, larger screens, and more pixels per inch. The $2795 1600SW from Silicon Graphics Incorporated (included in the **Digital Flat Panel Solution Pack**) offers 17.3 viewable inches—close to what you'd expect from a 19-inch CRT. It also displays resolutions up to 1600 by 1024, thanks to its bundled 32MB Number Nine Revolution IV FP accelerator board. And because it uses a digital interface instead of the more typical analog, image quality is stunning.

In my test of a shipping unit, text appeared razor-sharp and legible even at 6-point type, and a photo of spring flowers showed sharply defined colors. Digital interfaces produce less noise and flicker resulting from digital to analog conversion, and enable slightly lower prices for LCDs. The 1600SW is also ergonomically designed: A comfortable viewing height is just a press of a lever away.



SGI'S DIGITAL Flat Panel package includes the 1600SW LCD and a Number Nine video card.

A costlier, analog alternative is Compaq's $3199 18-inch **TFT8000**, which displays a default resolution of 1280 by 1024. But higher price doesn't guarantee better image quality. The shipping version of the TFT8000 I looked at did well on our text tests, particularly on spreadsheets and documents with small text, but colors lacked the naturalism of SGI's 1600SW. The TFT8000 can, however, swivel left or right, offering more viewable angles than the 1600SW.

IBM also offers an analog ($2999) and digital ($2849) 18-inch LCD panel that supports 1600 by 1280 resolutions. But if you can't afford to splurge, these panels are too expensive for most mainstream business uses.

—Mick Lockey

Compaq TFT8000

PRO: Dark, sharply etched text; swivels for good viewable angles.

CON: Expensive, colors lack realism.

VALUE: Financial types will like the way it displays text and numbers.

Street price: $3199

Compaq Computer

800/888-0220

www.compaq.com

PRODUCT INFO NO. 708

Digital Flat Panel Solution Pack

PRO: Vivid graphics, great design.

CON: None significant.

VALUE: Pricey, but an excellent choice for Web developers and spreadsheet users.

List price: $2795

SGI

800/744-7373

www.sgi.com/go/flatpanel

PRODUCT INFO NO. 709

PageKeeper—Good Secretary, So-So Librarian

DOCUMENT MANAGER

YOU KNOW you've seen Joe's phone number somewhere—it's in one of the hundreds, perhaps thousands, of documents on your hard disk. But short of going through each document, what can you do to retrieve it? The solution: Let a document manager find it for you. Caere's $49 **PageKeeper Pro 3.0** can even gather all Joe-related documents in one place, and then fax or e-mail them with a mouse click.

In the prerelease version I tested, Caere made two significant improvements to PageKeeper's search engine: Boolean operators to facilitate searching; and relevancy ranking, which prioritizes found documents for you. A third promised enhancement—keyword indexing, which should speed up searches—had yet to be implemented.

One useful, new feature that performed flawlessly in my test is Smart Folders, which gathers documents into virtual folders based on criteria you specify and displays them as thumbnails. Unlike ScanSoft's PaperPort, PageKeeper does not import the documents themselves; instead it creates an index (using optical character recognition, if necessary, to read text) and thumbnail representations of the documents. If you change the original documents, the application automatically refreshes the thumbnails to reflect the changes.

Not importing the actual documents is a mixed blessing: Searches always deliver your current documents, but PageKeeper can't create a historical record of them. And unfortunately, as with previous versions of PageKeeper, this latest version doesn't index whole folders with subfolders, or an entire hard drive; rather it indexes only those files you specify.

Overall, PageKeeper Pro 3.0 is useful for keeping on top of the daily infoglut, but less so for long-term archiving. In other words, it makes a better secretary—a well-priced one—than librarian.

—Dan Littman ▶

PageKeeper Pro 3.0

PRO: Easy to use, updates constantly in the background.

CON: Doesn't archive the history of your documents.

VALUE: You get a lot of software for the money.

List price: $49

Caere

800/535-7226 ext. 110

www.caere.com

PRODUCT INFO NO. 710

Simply the BEST

Winner Macworld 1997 Editors' Choice Awards

PC MAGAZINE EDITORS' CHOICE
May 26, 1998
QMS *magicolor* 2 CX

BYTE BEST

The QMS *magicolor* 2.

The Best Color Laser Printer.

GSA contracts available.

*All prices in US dollars.

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Circle 197 on card or go to www.pcworld.com/productinfo

Editors' Choice Award — The QMS® *magicolor* 2 CX

"Color laser printers have now become affordable enough that some small offices can deploy one as their only shared printer. None exemplify this more than our Editors' Choice in this category, the QMS *magicolor*® 2 CX."

— PC Magazine, May 1998

Best Overall — The QMS *magicolor* 2 CX

"QMS's relatively low-cost *magicolor* 2 CX makes a clean sweep in all categories, including best-overall, best-quality, and best-value color laser printer."

— BYTE Magazine, April 1998

The Best Business Printer — The QMS *magicolor* 2 CX

"The QMS *magicolor* 2 CX speeds along at 4 pages per minute in full color—16 ppm in black and white—providing unprecedented performance in an under $4,000 color laser printer."

— Macworld Magazine, January 1998

The Best of LAN Times — The QMS *magicolor* 2 DeskLaser

". . . there's no competition from any inkjet printer. Not even close."

— LAN Times Magazine, August 1998

QMS *magicolor* 2 family starting at

$1,299*

QMS

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www.qms.com

Internet Postage Saves Time and Shoe Leather

POSTAGE LIKE BOOKS, CDs, airline tickets, and almost anything else money can buy, stamps for snail mail are going online. Under the U.S. Postal Service's loftily titled Information-Based Indicia Program, several vendors are introducing products and services that will let you buy postage over the Internet and print it directly onto your envelopes or labels using ordinary printers or special postage-meter-type devices. Postage bought over the Net promises to be cheaper and more convenient than conventional meters or regular stamps, though you can't use e-postage to send mail outside the United States yet. I tried out preproduction versions of two e-postage efforts.

Neopost's **Simply Postage** is a small postage meter that downloads postage from the Internet and prints it onto special labels. Postage appears in the form of the USPS's new indicia. These consist of a unique, two-dimensional bar code and information such as the amount of postage and the sender's meter ID number. A $50 starter kit buys the device, which looks like a small label printer; a greeting card application; 10,000 pieces of clip art; a scale that hooks up to the device; and a $50 postage credit. (The greeting card software, clip art, and scale were not included with my preproduction unit.)

The device that I tested came with a serial port connection, but Neopost plans to offer a Universal Serial Bus cable by the time you read this. The software calculates the amount of postage required for different classes of mail based on the weight of the item, either entered by you or read from the scale. To print postage, you click a button—or if you prefer, you can detach the device from your PC and hit a hardware button to generate stickers for the same amount as the last sticker printed.

DESKTOP POSTAGE STORE

UNLIKE SIMPLY POSTAGE, **Stamps.com** requires no special hardware whatsoever: You simply download an application from the Stamps.com Web site, set up an account, and purchase postage. After that, you can print postage in the form of the indicia, along with addresses and the PostNet bar code needed by the post office for sorting, on envelopes or labels using your existing printer. You can even add a small graphic to give a big-office look to your small-office mail. Because your postage account is kept on the company's server, you must be online to print postage.

One benefit of the software is that it verifies the zip + 4 codes of new entries by checking them against the USPS's huge address database. In my tests importing my Act contact list, the software rejected addresses that didn't meet USPS formatting requirements, but the application then let me fix them. You can also look over logs of postage purchases and printing.

The service does have a few odd limitations. For example, while you can specify fonts and point sizes, everything is printed in capital letters. Also, you can mail only to names listed in the application's address book, which you create manually or by importing data from popular contact managers such as Symantec's Act 4.0 or Microsoft Outlook 98.

Besides the $50 for its kit, Simply Postage costs $18 a month, which includes one free download of postage purchased online at cost. The device stores up to $500 worth of postage, and additional downloads cost $5 each. Blank postage labels run $7 for 100 or $10 for 200. By comparison, monthly fees for traditional postage meters (which these days can download purchased postage via 800 numbers) run $28 and up.

SIMPLY POSTAGE doesn't require a PC to print.

Stamps.com, which hopes to launch in early spring, expects to collect a surcharge of about 10 percent for postage purchases, with no minimum purchase requirement. That's cheaper than my bank's surcharge for paper stamps bought at an ATM. For many small and midsize businesses, e-postage will be a welcome alternative to today's costlier, more time-consuming options. —*Yardena Arar* ▶

Simply Postage

PRO: Cheaper than a conventional postage meter.

CON: Similar to existing devices, can't print addresses or envelopes.

VALUE: Best for small businesses with significant postage expenses.

List price: $50 plus $18 monthly fee (includes one free download). Additional downloads $5.

Neopost
877/397-8267
www.simplypostage.com
PRODUCT INFO NO. 711

Stamps.com

PRO: Inexpensive, uses PC printer, verifies zip codes.

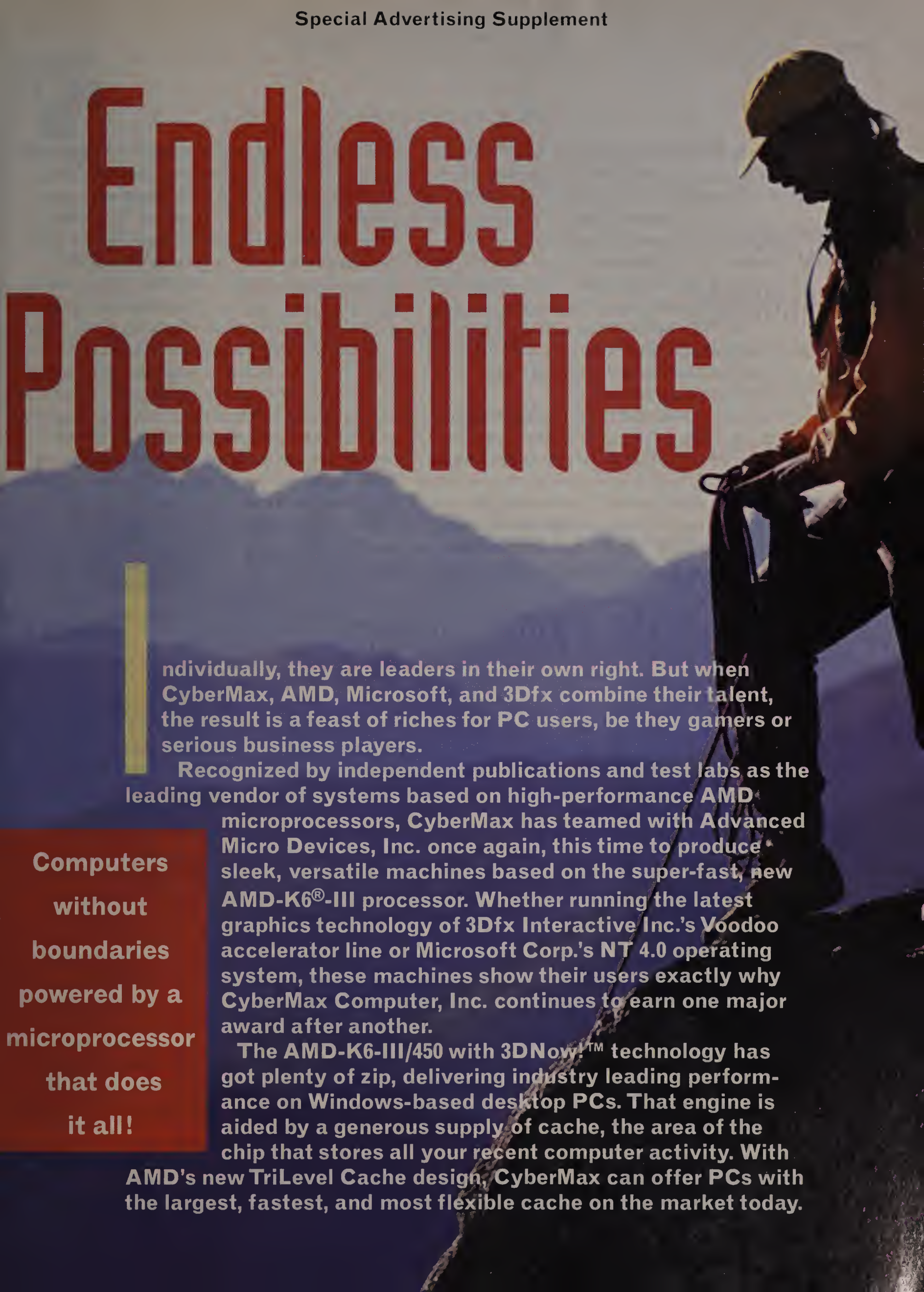
CON: You must use built-in address book and strict USPS formatting.

VALUE: Great for home or SOHO users who want convenient, professional-looking printed postage.

Street price: About 10 percent of purchase.

Stamps.com
800/877-7678
www.stamps.com
PRODUCT INFO NO. 712

Endless Possibilities



Individually, they are leaders in their own right. But when CyberMax, AMD, Microsoft, and 3Dfx combine their talent, the result is a feast of riches for PC users, be they gamers or serious business players.

Recognized by independent publications and test labs as the leading vendor of systems based on high-performance AMD microprocessors, CyberMax has teamed with Advanced Micro Devices, Inc. once again, this time to produce sleek, versatile machines based on the super-fast, new AMD-K6®-III processor. Whether running the latest graphics technology of 3Dfx Interactive Inc.'s Voodoo accelerator line or Microsoft Corp.'s NT 4.0 operating system, these machines show their users exactly why CyberMax Computer, Inc. continues to earn one major award after another.

Computers without boundaries powered by a microprocessor that does it all!

The AMD-K6-III/450 with 3DNow!™ technology has got plenty of zip, delivering industry leading performance on Windows-based desktop PCs. That engine is aided by a generous supply of cache, the area of the chip that stores all your recent computer activity. With AMD's new TriLevel Cache design, CyberMax can offer PCs with the largest, fastest, and most flexible cache on the market today.

AMD K6 III PROCESSOR 3DNOW!

Endless Possibilities

Largest because the maximum total system cache is more than four times bigger than with an Intel Pentium III (2,368K vs. 544K). Faster because the large, 320K internal caches run at full processor speed. And more flexible because the AMD-K6-III is the first desktop processor with the option of adding a third level of cache running on a 100Mhz system bus. That all means the things you do the most will work the fastest.

The fact is, AMD-K6-III/450-based PCs are faster on leading consumer desktop applications than PCs based on Intel's fastest desktop processor, the Pentium III 500.*

Moreover, AMD and 3Dfx have worked closely together to optimize the AMD-K6-III for the world of 3D. The result? Games are faster, more realistic, and have greater depth. Multimedia is no longer a waiting game. Three-dimensional views on the Internet come alive. And productivity apps no longer choke on fancy graphics. CyberMax PCs, by integrating the hottest CPU technology from AMD, and the fastest Voodoo 3D gaming acceleration from 3Dfx, can produce the sharpest graphics, the fastest and clearest video, and the best in sound.

And don't worry about compatibility. CyberMax continues to rack up the accolades of the major test labs with awards not only for compatibility, but also for reliability, support, and service (see sidebar). Over 60,000 software titles run on the AMD-K6-III processor. With the help of partners like Microsoft, hundreds of new titles are now optimized for the AMD 3DNow! tech-

The CyberMax Relationship

Ask most folks about their computer and they'll rattle on about its monitor, modem, megabytes, and megahertz. Ask small business owner Kim Bergen and you're apt to hear something a little fuzzier, and a whole lot warmer.

That's because Bergen bought her latest PC from Allentown, Pa.-based CyberMax Computer, Inc., a 10-year-old rising star in the world of direct selling. "When I started my own company I knew I wanted something other than a Mac. But I wasn't sure what type of computer would best meet my needs," Bergen explains. "I was talking to a supplier of mine one day who recommended I give CyberMax a try. He was very pleased with the system he had, and was very happy with his entire experience in dealing with the people at CyberMax."

Word of mouth wasn't enough for Bergen. The president of Bergen Polymers, Inc., a plastics recycling concern in Pottstown, Pa., did a little investigating. Berger borrowed a friend's computer, hit the Internet, and checked out the CyberMax site (www.cybermaxpc.com). "I was impressed with all the information that was available about the different systems."

That wasn't enough. Bergen wanted to talk to the company itself. "I was going to be putting out company money for something I considered to be a long-term investment, so I had a lot of questions. I called CyberMax that day and it was the best call I ever made."

TREATING CUSTOMERS RIGHT

So what's so great about CyberMax? According to customers, it has to do with the entire sales cycle, and how the company treats people afterward. Sales reps take the time to explain the product, and they invariably know what they are talking about. Afterwards customers can count on unlimited, toll-free, lifetime support, available 24 hours a day,

nology. Over 8 million people are already enjoying systems equipped with 3DNow! technology.

Microsoft is supporting the new AMD-K6-III processor in several ways. For example, for graphics and game aficionados, the AMD chip is fully compatible with Microsoft's DirectX 6.1, a system that speeds and smoothes the performance of games and multimedia titles.

CyberMax has been a pioneer in direct marketing of computers for over 10 years. And for all that time, CyberMax has used AMD chips to build the best PCs money can buy. The best is now a whole lot better with the AMD-K6-III.

CyberMax and its partners have teamed up to offer the chance to win AMD-K6-III and 3Dfx-based systems. Register for your chance to win at http://www.pcworld.com/3dstorm

No purchase necessary. Enter online by 4/30/99. Must be 18 or older to enter online. See rules in the Consumer Watch section for an alternate method of entry. Open to residents of 50 United States and Canada (except Quebec province).

THE ENTHUSIAST SERIES

CyberMax knows there are two main types of customers: those with computers at home, and those who have to use them at work. To deliver uncompromising performance to the home, CyberMax developed the Enthusiast Series, an AMD-K6-III-based, Windows 98-loaded line of machines that accelerate 2D and 3D titles with brand-new Voodoo technology from 3Dfx – allowing home/SOHO users to work by day and take off with the hottest new 3D games after dark.

the Enthusiast REBEL

365 days a year (more on Leap Year).

Bergen was a bit of a beginner, but CyberMax gets similar raves from computer pros, folks like David A. Gillespie, Jr., director of computing services for the private Hawken School in Ohio. Hawken runs with the help of some 120 CyberMax computers.

Gillespie may have never hooked up with CyberMax, were it not for the foibles of his previous supplier, a company that sold the school eight computers — only one of which was still in service two years later.

Gillespie, a Carnegie Mellon computer science alumnus, looked into CyberMax because of its low prices and variety. He stayed with the company because of people like Bill Hawkins, a CyberMax rep. "He's always been very helpful, getting back to me whenever I have questions about system specs or pricing, and keeping me aware of special deals," Gillespie says. Other local suppliers have tried to steal the CyberMax business — to no avail. "We have a good track record with CyberMax and I can't imagine leaving them."

With all this, it is no wonder the awards keep pouring in. In 1998, CyberMax was given the Direct Channel Achievement Award from *Computer Shopper*. Given out at Fall Comdex in Las Vegas, the award is based on excellence in service, technology, and reliability.

CyberMax machines have won numerous other awards, such as *PC World* Best Buy and *PC Magazine's* Editors' Choice. In fact, *PC World* surveyed CyberMax customers and found that a staggering 95 percent would buy another machine from CyberMax due to their reliability. Ninety-four percent would buy again based on service.

This isn't just coincidence. CyberMax not only trains its techies about interrupts and DVDs, but counsels them on more personal subjects, such as how to handle PC novices. ■

http://www.cybermaxpc.com

Endless Possibilities

CyberMax calls these "PCs with attitude!" Just how much attitude depends on how they're configured: Do you want 64 megs of RAM or 128? A 4.3 gigabyte hard drive or 13? A 56K modem or Digital Subscriber Line (DSL) connection? The choices are always up to you, dictated by your needs.

VOODOO POWER

Opening up a whole new dimension in gaming, the Enthusiast Series from CyberMax comes standard with one of the award-winning 3D accelerators from 3Dfx Interactive. Optimized for AMD®'s 3DNow! technology, the Voodoo2™, Voodoo Banshee™ and Voodoo3™ from 3Dfx deliver lightning-fast frame rates, mind-blowing visual effects, and breath-taking image quality which has made them the largest selling 3D accelerators on the market.

> "We have a good track record with CyberMax and I can't imagine leaving them."
>
> —David A. Gillespie, Jr., director of computing services, Hawken School

The amazing new Voodoo3 2D/3D accelerator combines ultra-high resolution graphics at up to 2048 x 1536 pixels with blistering 3D acceleration unmatched by any other 3D accelerator. Pumping out an unheard of 7 million triangles per second, the Voodoo3 brings to life a library of over 500 of the hottest titles at speeds upwards of 60 frames per second. And with the latest in DVD hardware acceleration built right in, the Voodoo3 can transform the CyberMax Enthusiast Series into the ultimate multimedia solution. Together CyberMax and 3Dfx offer speed, power, price, and performance unparalleled in the PC marketplace.

No wonder 3Dfx dominates the U.S. retail market – capturing 73% of the performance/gaming segment for video cards, according to a recent report by PC Data.

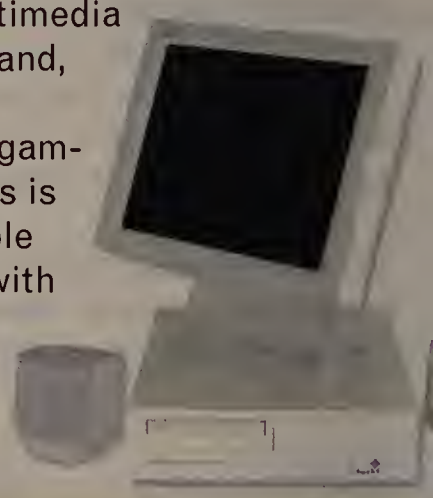
FOR BUSINESS USERS

CyberMax knows that the PC world is not all fun and games. So for business users, CyberMax has developed the Entrepreneur Series. These machines, "built with business in mind," run Microsoft's Windows 98 as well as Windows NT Workstation 4.0, the most reliable and powerful operating system in the PC market today.

NT may be powerful, but that doesn't mean it is hard to use. On the contrary, NT uses the same interface millions of Windows 95 and 98 users know and love. NT Workstation, however, is three times as reliable as Windows 95, according to research by SOFRES/Inter-Search. Power and ease of use come at a price. In this case, the price is a powerful machine. At least 64 megs of RAM and a 300Mhz processor are needed to run NT effectively. AMD easily meets and exceeds these. As it is, an AMD-K6-III/450-based PC runs NT faster than an Intel Pentium III 450 PC.*

CyberMax, with its CyberMax Entrepreneur Line, is equally up to the challenge. Most of these machines come stock with 128 megs of RAM. The new AMD-K6-III processor serves up all the raw power and computational accuracy business users demand.

CyberMax's latest NT machine, the Entrepreneur Pro Slimline RL, is a perfect example. It starts with a 400Mhz AMD-K6-III processor, has a snappy 40X CD-ROM, Altec Lansing ASC 45.1 Speakers, and a modern 15" flat screen color LCD monitor. It not only runs all your NT productivity applications, but it can handle all the multimedia your applications demand, today and tomorrow.



So whether serious gaming or serious business is your thing, an affordable CyberMax PC fueled with a powerful AMD-K6-III processor is right for the job. ■

*Benchmark system configuration: STB Velocity 4400 16MB AGP (driver ver 1.42), WD AC31300 13GB IDE, AMD-K6-III processor based system: Biostar M5ALA mainboard /w 512KB off-chip cache. Pentium III processor based system: Biostar M6TBA mainboard. Windows 98: DirectX 6.1, FAT32, 128MB SDRAM

From 20 to 200 servers, only a scalable Power Array gets reliability done *right*

You've survived downsizing and rightsizing. You've seen the mainframe come and go a few times. Users who once demanded the power of distributed client/server are now asking you to take back what you gave them and make it available 99.999% of the time.

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Ron O'Reilly, Field Support
Formerly Manager/IS,
Toyota Motor Sales, USA

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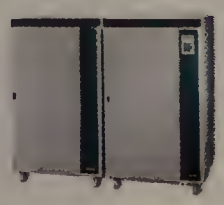

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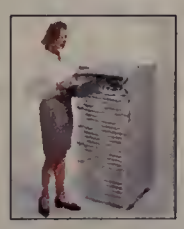

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It's a Radio, It's a PC Speaker Set, It's Model 88

PC AUDIO

MY SECRET IS out: The computer speakers on my desk are really a radio in disguise. Cambridge Soundworks' **Model 88**, designed by audio pioneer Henry Kloss, is a table radio that sounds like a high-end audio component. And thanks to its extra stereo inputs, the shipping version I tested brilliantly reproduced the sounds cranked out by my PC.

CAMBRIDGE SOUNDWORKS' RICH-SOUNDING Model 88 offers crisp, hypersensitive radio reception and inputs for PC sound.

Model 88 's compact (14 by 8 by 4.75 inches) if boxy exterior belies the range of sounds it can produce. Some two-thirds of the box is taken up by a powerful subwoofer, which explains the unit's particularly rich, full sound.

The radio's plain front panel has 19 dedicated function buttons for selecting inputs—the radio's AM or FM bands, the computer, or other audio components such as a tape or CD player; volume controls and six user presets of radio stations for both AM and FM; and three buttons to adjust the sound, from mono to wide stereo for a palpable surround-sound effect. On the back is a separate control for the subwoofer range—boom box to natural balanced sound. A slender remote control, which replicates the front panel controls, is another nice touch.

More importantly, Model 88's sure-handed radio reception must have been inherited from Jerry Rice. Even in *PC World*'s steel and concrete office, where I'm lucky to get a cordless phone to work 6 yards from the base, Model 88 picked up stations loud and clear on both FM and AM—without the included wire antenna.

If you're in the market for PC speakers or a radio, Model 88 is well worth its $199 price. Not only do you get a set of PC speakers that do justice to your CDs and DVDs, you also get a terrific radio tuner to boot. —*Michael S. Lasky*

Model 88

PRO: Top-notch stereo PC speakers plus radio with great reception, in a single box.

CON: Pricey if all you are looking for are speakers.

VALUE: Combination of subwoofer speakers and radio is a great deal.

List price: $199

Cambridge Soundworks

800/367-4434

www.hifi.com

PRODUCT INFO NO. 713

Sony Printer Beats a Trip to the Photo Store

PRINTER

IT MAY LOOK like an oversize answering machine from the 70s, but this two-tone gray box is actually Sony's new 600-dots-per-inch photo printer. The $429 **FVP-1 Mavica Photo Printer** lets you print 3-by-5-inch photos with or without a PC, and it offers several ways of capturing digital images.

It's the only photo printer I've seen that's equipped with a floppy drive. You insert a floppy into its disk drive (which reads .jpg, .bmp, or the printer's proprietary .nui graphics files) and view the images by connecting the printer to a television using its video-out or S-video connector.

In addition to floppies, you can also capture, retrieve, or print photos from digital cameras, TVs, VCRs, camcorders, and PCs. But to connect the printer to your computer, you must have a graphics card with a video-in port. In my tests using a shipping FVP-1 unit, capturing an image from television video took roughly 10 seconds to save to the printer's memory. The printed photos looked decent, but I noticed some slight ghosting and blurring flaws—no doubt from my TV reception.

Inconveniently, for the printer's drive to read the .jpg files I'd saved on a floppy, I had to first convert the images to the .nui file format using Sony's simple photo utility. After that, I popped the floppy back into the printer drive and was able to print a crisp, colorful photograph within 2 minutes.

The Mavica's thumbwheel-like button control lets you make index prints or multiples of 2, 4, and 16 images on a sheet. The printer requires photo paper, which doesn't ship with the unit. Sony sells a 50-pack paper and ink cartridge combo for $45. It also offers an optional $99 automatic paper feeder that holds 100 sheets; the alternative is manually inserting a sheet at a time in the printer's paper port.

Although somewhat pricey, this easy-to-use photo printer yields nice pictures, offers the convenience of floppies, and ends tedious trips to the photo shop. —*Grace Aquino* ▶

Sony FVP-1 Mavica Photo Printer

PRO: Prints good-looking photos, stored on floppies, in easy steps.

CON: To connect the printer to a PC, you need a graphics card with a video-in feature.

VALUE: Easy-to-use and versatile photo printer.

Street price: $429

Sony

800/352-7669

www.sony.com/image

PRODUCT INFO NO. 714

Turn Talk Into Text. *Instantly!*

L&H Voice Xpress Professional™
is the ultimate continuous speech dictation software for today's business professional.

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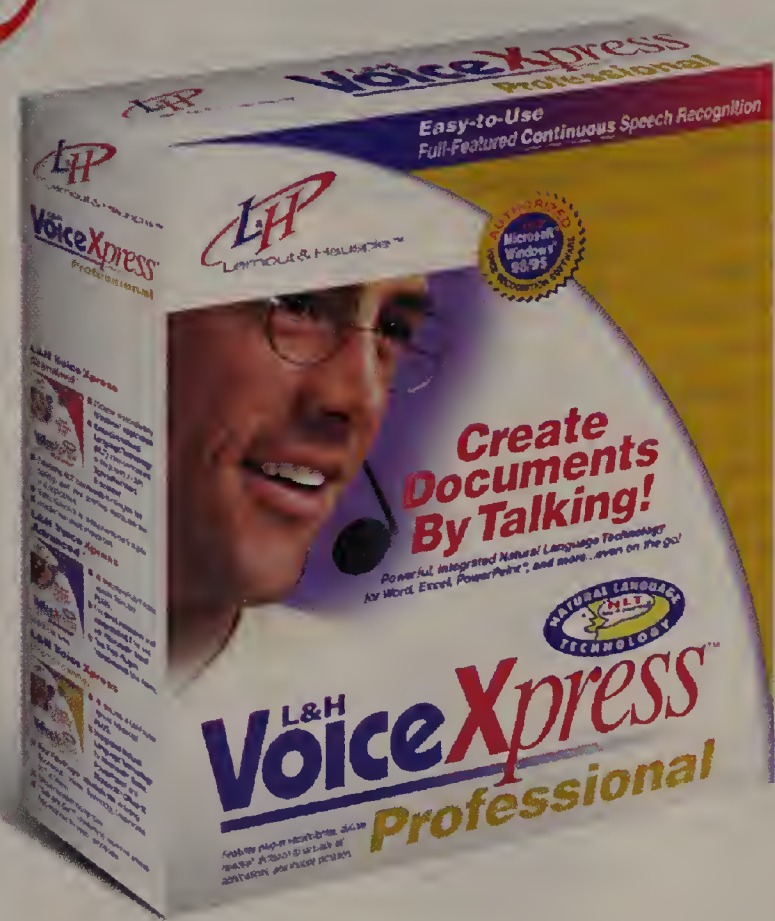
- NEW Reads documents back to you – making editing a snap.



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Ultraportable Projectors: Downsizing That Doesn't Hurt

PROJECTORS

FORGET FLIP charts and hardcopy handouts: Portable projectors, which until recently were too bulky and expensive for general use, are getting smaller, lighter, and more affordable. Last year's typical 15-pound, $10,000-plus portables are giving way to so-called ultraportables, which weigh less than 10 pounds and cost as little as $3000. Stretch your budget to $6000, and you can pick up a lightweight model with advanced features such as autozoom, autofocus, and a remote control equipped with a laser pointer.

LIGHT AND BRIGHT: THE 6.8-POUND InFocus LP400 was the lightest unit yet produced the brightest images.

We looked at four recently released models, all costing less than $6000 and weighing under 10 pounds (without carrying case or cables): the CTX Opto EzPro 585, InFocus LP400, Proxima UltraLight LS1, and Sony VPL-SC50U. All four projectors are relatively easy to set up and use and come with the cables to connect to a notebook PC, VCR, laserdisc or DVD player, or camcorder. In addition, they include built-in speakers, plus a feature for checking on the status of the units' lamp life. (Metal-halide lamps on the less expensive projectors start to lose their brightness at the half-life point, whereas the newer ultrahigh-power lamps maintain full brightness for about 85 percent of their life.)

I evaluated each projector by hooking it up to a 266-MHz Toshiba notebook and projecting a series of PowerPoint presentations, digital photos, test patterns, and other images onto a 50-inch portable tabletop screen as well as onto a highly reflective white wall. I also connected each unit to a TV tuner and S-VHS VCR to see how well it projected images from a video source. Each ultraportable produced fine-looking images that projected reasonably well in low-light rooms at the 8- to 12-foot distances typically used for small-group presentations. (You'll have to spend considerably more for so-called conference-room projectors that work in auditoriums or large halls.)

While all four projectors are optimized to run at 800 by 600 resolution, their software allows them to project at 1024 by 768—though at that resolution, small type (font sizes below 10 points) may become blurry and difficult to read.

DLP VERSUS LCD

PRICED AT $3299, the InFocus LP400—successor to the vendor's popular LP425—is advertised as a 6.8-pound unit but weighs 8 pounds with carrying case and cables. But that's still lighter than the stand-alone weight of any other unit here: The LP400 is the only projector we reviewed based on Texas Instruments' Digital Light Processing technology, whose components are lighter than those used in LCD-based projectors. While LCDs generally deliver richer, more saturated color and images of more uniform brightness from the edges of the screen to the center, DLP projectors tend to be brighter overall—and, true to form, the InFocus LP400 was the brightest of this bunch. Not surprisingly, the LP400's 270-watt metal halide lamp also had the highest ANSI lumens rating (a standard measure of light output). However, its half-life of 1000 hours was among the shortest in this group.

THE PRICE IS RIGHT: At $2995, CTX Opto's EzPro 585 is the cheapest projector tested but also the heaviest.

The LP400 produced excellent results with our entire test suite. But because it has a fixed lens, you must move the projector back and forth to adjust the image size, a task performed more easily by zoom lenses in high-end models. The LP400 is also the only unit we reviewed that doesn't ship with a remote control, which means you'll be tethered to the unit during presentations (unless you pay between $135 and ▶

SPOTLIGHT

Portable LCD projectors are getting lighter and cheaper. We looked at four of the newest and found the following:

- Prices under $6000
- Weight under 10 pounds
- SVGA resolution
- Brightness suitable for small-group presentations
- Models small enough to qualify as carry-on luggage

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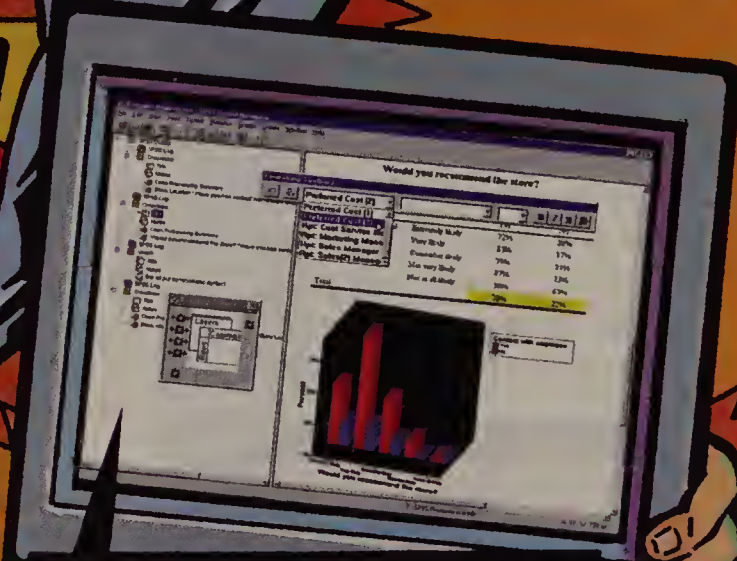

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$379 for a remote control and receiver option). Nevertheless, its low price, light weight, and excellent performance recommend it as a fine no-frills presentation tool.

A remote control is the best news about the $2995 CTX Opto EzPro 585, the other relatively inexpensive projector in this group. At 9.9 pounds—a hefty 17.7 pounds with case and cables—it's the heaviest projector I evaluated. Its images, while acceptable, were among the dimmest in the group, and it tied with the InFocus for shortest lamp half-life. Even the remote control makes compromises: Its design is clunky, with buttons bunched together like on a television remote control (other units put more space between buttons). In addition, the CTX Opto unit uses an on-screen cursor rather than the laser pointer that comes with the more expensive projectors. Still, its bargain price makes the EzPro 585 an acceptable choice if you must have a remote control and need to keep your costs down.

MORE BUYS MORE

THE $5999 Proxima UltraLight LS1 may be the most expensive projector we looked at, but it also offers the best features. Of these, the optical power zoom and focus are the most useful because they significantly accelerate and simplify the tasks of setting image size or fine-tuning images after changing source (from PC to VCR, for example). Another plus that justifies the higher cost: You can access these features from both the control panel and a very well designed remote unit that also comes with mouse controls and a laser pointer. Image brightness was good, and the Proxima delivered better color and provides more image adjustment controls (such as sharpness and white balance) than the InFocus. The 120-watt ultrahigh-power lamp boasts a 2000-hour half-life. Unfortunately, the projector's 8.4-pound weight jumps to 14.4 pounds with case and cables.

POWER PUNCH: The Proxima UltraLight LS1's power zoom and focus make controlling image size and fine-tuning quality exceptionally easy, but you pay a hefty premium.

Last year's 15-pound, $10,000-plus portables are giving way to so-called ultraportables, which weigh less than 10 pounds and cost as little as $3000.

Weighing in at 8.2 pounds and priced at $5990, the sleek Sony VPL-SC50U is almost as heavy and expensive as Proxima's UltraLight LS1 (it's more expensive if you add in the $80 cost of a carrying case, which is included with the other three units). Like the Proxima, the Sony projector delivers more image adjustment controls, generally superior color, and a zoom lens that lets you adjust the size of the image without moving the projector. However, the zoom and focus controls work only manually; you can't adjust them remotely.

The Sony is also the only projector here that doesn't provide rear and ceiling projection features for automatically reversing or flipping images via the on-screen menu. Its 120-watt ultrahigh-power lamp is not quite as bright as the Proxima's (although its 3000-hour half-life is the longest in this group). Both the Proxima and Sony have a control panel light that starts flashing toward the end of the lamp's life, as opposed to the on-screen warning you get with the less expensive units.

The InFocus LP400 gets my nod as the entry-level projector of choice if you're in the market for a featherweight unit that delivers great image quality for the lowest price. But if you can afford to spend more, the Proxima UltraLight LS1 is a zinger of a projector for those who want a more sophisticated presentation companion.

—*Richard Jantz* ■

FEATURES

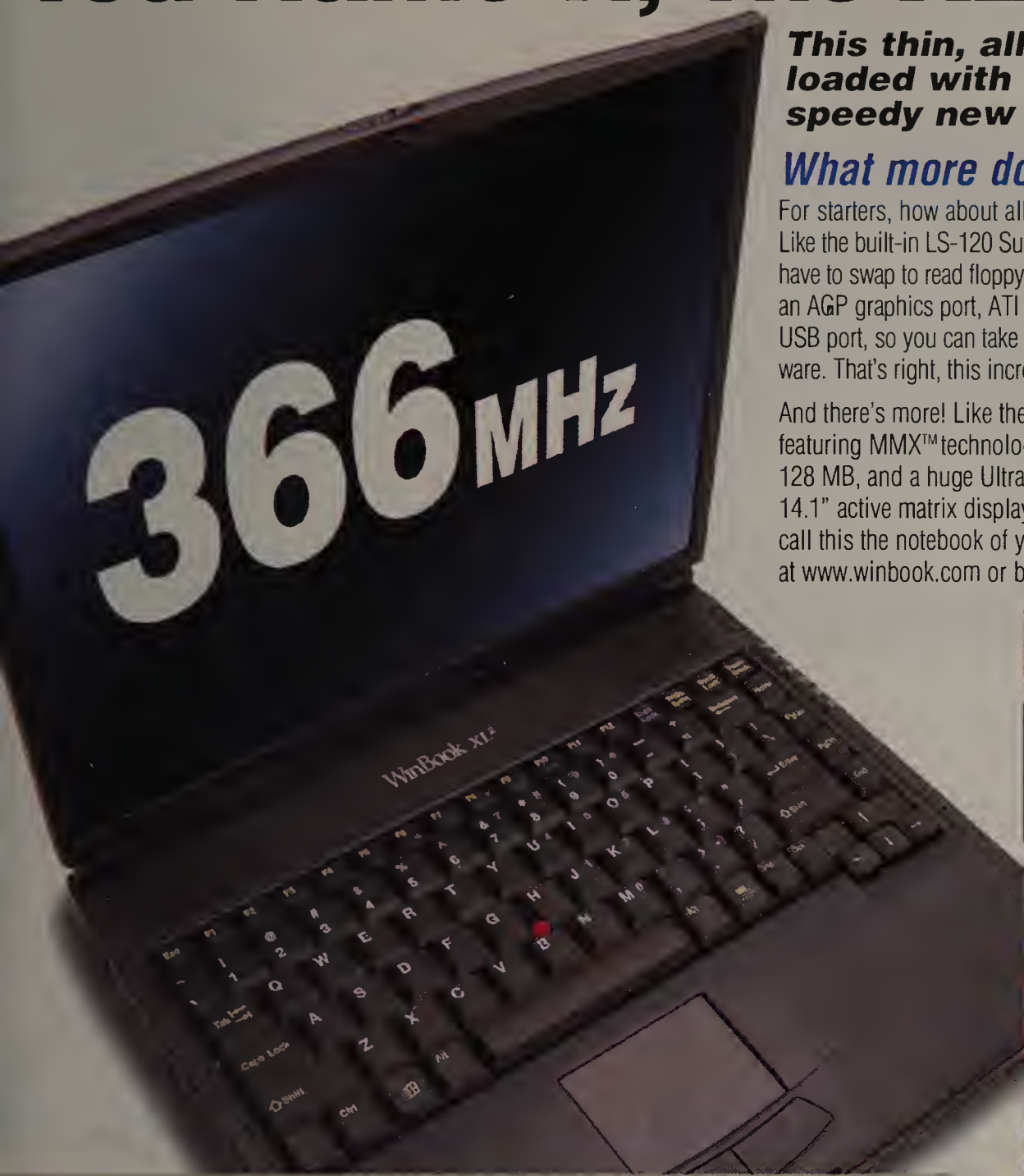
Personal Projectors Get Cheaper, Lighter, and More Versatile

PRODUCT	List price	Weight (stand-alone/traveling,[1] in pounds)	Brightness (ANSI lumens)	Lamp half-life (hours)/ replacement cost	Comments	Product info number
CTX Opto EzPro 585 888/942-2929 www.ctxopto.com	$2995	9.9/17.7	500	1000/$295	LCD, remote control; heavy for its class	715
InFocus LP400* 800/294-6400 www.infocus.com	$3299	6.8/8	700	1000/$350	Digital Light Processing, very bright images, light weight; remote control costs extra	716
Proxima UltraLight LS1* 800/447-7692 www.proxima.com	$5999	8.4/14.4	600	2000/$399	LCD, optical power zoom and focus, best remote control unit	717
Sony VPL-SC50U 800/686-7669 www.sony.com/professional	$5990	8.2/12	500	3000/$465	LCD, nice remote control; lacks autozoom, autofocus, and rear-projection capability	718

* Recommended

[1] Traveling weight includes case and cables.

You Name It, The XL²'s Got It.



This thin, all-in-one notebook is loaded with features plus Intel's speedy new chips!

What more do you need?

For starters, how about all the premium features you want included? Like the built-in LS-120 SuperDisk™ and DVD-ROM Drives – so you don't have to swap to read floppy disks or CD ROMs. Plus, a 2x DVD-ROM drive, an AGP graphics port, ATI Rage LT Pro 3-D graphics acceleration and a USB port, so you can take full advantage of emerging software and hardware. That's right, this incredible notebook is future-proofed!

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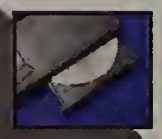
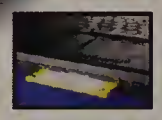


2x DVD-ROM built-in (Reads CD-ROM)

2x AGP Graphics Port for fast 3-D rendering

ATI Rage LT Pro 3-D w/4 MB of SGRAM for dazzling graphics



LS-120 SuperDisk™ Drive built-in (Reads and writes 120 MB SuperDisk™ Diskettes and 1.44 MB floppy disks)

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- *LS-120 SuperDisk™ Drive (Reads floppy disks) and DVD-ROM Drive (Reads CD-ROM), both built-in, no need to swap*
- *Integrated dual-button Touchpad and Pointing Stick, both active simultaneously*
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- *Two Type II PCMCIA slot, CardBus and Zoomed Video supported*
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BY HARRY McCRACKEN, JOHN WALKENBACH, CELESTE ROBINSON, AND PAUL HELTZ

Office 2000

108 OFFICE 2000 | **109** Word | **111** Excel | **112** Access | **114** Outlook | **116** FrontPage | **120** PowerPoint

ILLUSTRATIONS BY MATSU

127 INTERNET EXPLORER 5

WORTH THE BOTHER?

s Microsoft's latest just for office-suite jockeys? Subtle enhancements to Word and Excel are welcome, but the package's new Web and intranet tools have more-limited appeal.

You can teach an old suite new tricks.

Judging from Microsoft Office 2000, though, the challenge gets tougher as time marches on. The old fella already fetches, shakes, rolls over, and brings you the morning newspaper—what's left to add?

Lots of little stuff, mostly. After spending several weeks with a prerelease version of Office 2000, we found that the vast majority of additions fall into two categories: Web tools, and refinements to existing features. In other words, the upgrade doesn't offer the kind of striking suitewide advances that Office 97 delivered two years ago.

To be sure, many users, especially those who sat out the Office 97 upgrade, will find one of the five editions of Office 2000 worth the investment—from $249 for an upgrade to the Standard or Small Business Edition to $999 for the full version of the Developer Edition. You can also buy the apps individually, at prices ranging from $60 to $109 for an upgrade, to $149 to $339 for the full-price versions (see "Office 2000: The Editions and Their Apps," page 110).

All the applications—particularly Word, Access, Excel, and Outlook—contain genuine improvements, and we like some of the new Web tools. Microsoft has also reduced the native file-format incompatibilities that riled early adopters of Office 97, though you'll likely run into snags with Access 2000 and HTML formats. Casual users, however, may not notice much difference in Office 2000 and shouldn't rush to upgrade. And some serious flaws, including haphazard browser compatibility, questionable tweaks to the interface, and seemingly half-finished workgroup features, turned us off.

We tested the Office 2000 beta on Pentium II-300, Pro-266, and MMX-233 desktops and notebooks. Microsoft says the suite will ship in late spring. After we use the final product, we'll be back with an update.

MORE DISK SPACE NEEDED

ALL EDITIONS of this upgrade require more disk space than their Office 97 counterparts, primarily because they have more apps and features. A typical installation of the Standard Edition requires about 189MB of space, and you'll need about 526MB for the Premium Edition. (By comparison, Office 97's Standard Edition takes up 102MB.)

Microsoft's minimum system recommendations depend on which of the five versions of Office 2000 you adopt. (You can check out Microsoft's Web site at www.microsoft.com/office/preview for specific system requirements.) Microsoft says that if you're satisfied with Office 97's performance on a particular PC, you'll be happy with Office 2000 on the same PC. Our tests support the accuracy of this claim overall, except that the suite's notably sluggish new help system takes forever to launch. (Microsoft says it'll be faster by the time the product ships.)

HIGHS AND LOWS

Sharper tools: You'll see improvements with File Open and File Save dialog boxes, the clipboard, Word's tables, Excel's PivotTables, and PowerPoint's formatting options, but they won't revolutionize the way you work. Alas, some revised features, including the new installation system, introduce new aggravations.

Office on the Web: Numerous changes to Word, Excel, and PowerPoint make it far easier now to create attractive, functional Web documents and post them on the Internet or a corporate intranet. But serious hitches plague some of these tools. Alarmingly, some produce Web pages that don't work in Netscape Navigator (see "Compatibility Conundrum: Frustration with File Formats," page 112).

Group gaffes: Office 2000 introduces a variety of Web-based collaboration tools (see "Teamwork Tools: Good Idea, Bad

Passing Judgment

Eight Important Changes

NO, OFFICE 2000 hasn't undergone massive reconstructive surgery—the changes are more like a low-key facelift. Still, the suite's user interface has some significant changes, as do suitewide features such as the help system and the installation program. Here's a report on what's new—starting with our favorite additions and ending with those we'd gladly live without.

Revamped File Open and Save

WHAT IT DOES: File Open and File Save dialogs now provide a browser-style list of recently used files and folders, plus the ability to save and open files directly on Web servers that run Microsoft's FrontPage Server Extensions. **THE VERDICT:** Very nicely done.

Collect-and-Paste Clipboard

WHAT IT DOES: The clipboard can now manage up to 12 items at a time, permitting you to selectively paste any or all of them between applications. However, it doesn't work with Publisher, FrontPage, or PhotoDraw. **THE VERDICT:** A welcome addition and one we'd like to see incorporated into Windows itself.

Office E-Mail

WHAT IT DOES: Revamped e-mail feature lets you easily send HTML versions of documents from within Office applications, so recipients don't need the originating programs to view them. **THE VERDICT:** Very handy.

Self-Repairing Applications

WHAT IT DOES: The suite can repair deleted or corrupted application files without your having to reinstall the whole kit and kaboodle.

Execution," page 118). They allow for threaded discussions inside Office documents and notification via e-mail when changes occur to documents and discussions. It's a nice concept, but design flaws hobble the tools' usefulness.

Piling on: Office 2000 is more expensive than Corel WordPerfect Suite and Lotus SmartSuite, but Microsoft has added new apps to increase the suite's value. Every Office flavor except Standard includes Publisher, a desktop publishing program. And for $200 more than the price of Office Pro, you can buy Office Premium, targeted at Web-intensive users. It comes with the FrontPage Web site editor and PhotoDraw graphics program. Since those apps sell for $149 apiece separately, Premium is a good deal if you need these extra capabilities.

WHO SHOULD MOVE UP?

THE HARDER you push the suite, the more likely you'll find the upgrade worthwhile. If you create intricate documents regularly in Word, slice and dice bushels of Excel data, manage your entire workday within Outlook, or design Web sites for a living using FrontPage, you'll discover many practical improvements and might want to consider moving to Office 2000. For corporate users, Access's new ability to serve as a front-end for SQL databases could be a major benefit.

But the new Web and collaboration tools are a mixed bag. Many users will make good use of them to create intranets and Web sites within Office. But beware: Compatibility issues will crop up in environments where people use various browsers and Web-authoring tools.

If you're a basic Office user and don't need to engage the suite's more sophisticated features, you might think about saving your money. True, features such as Word's smarter automatic spelling checker and new multiple-item clipboard have near-universal appeal. But not everyone will find them worth the cost—not to mention the labor—of upgrading to a new suite.

In the following sections of the article we review Word, Excel, Access, Outlook, FrontPage, and PowerPoint. For coverage of the suite's two other major apps, Publisher and PhotoDraw, see "Office 2000: The Editions and Their Apps," page 110.

Word 2000

Major Tweaks, HTML Tricks

What's hot: Smarter spelling checker, better table and graphics tools, much-improved Web authoring.

What's not: HTML files aren't fully compatible with some applications; Web folders require server software.

FOLKS WHO'D like to start creating Web pages will get the most out of Word's new user-friendly Web-authoring tools. But most word slingers will find the upgrade only a modest improvement.

Refinements to Word's user interface, such as the revamped clipboard and File Open and File Save dialogs (see "Passing Judgment: Eight Important Changes," below), are common to other Office components. So is the formatting toolbar's font list, which now renders each typeface name in its own font, al- ▶

It requires the Office CD-ROMs or a properly configured network installation. **THE VERDICT:** A convenience that can help you recover from PC disasters more quickly.

Single Document Interface

WHAT IT DOES: Like a Web browser, Office 2000 apps place multiple documents in separate windows, each with its own Windows taskbar button. This feature can be disabled in most Office apps, but not in Word. **THE VERDICT:** Can make jumping from file to file easier, but users who open scads of documents will find their taskbar bursting at the seams.

Install on Demand

WHAT IT DOES: To conserve disk space, you can tell the Office setup program to leave some features uninstalled but display them in Office's menus. Office can add these features on the fly as needed (from CD-ROM or from a properly configured network). **THE VERDICT:** Get ready to rummage for your Office CD—this feature would be useful if menus indicated which choices aren't really installed.

HTML-Based Help System

WHAT IT DOES: Help pops up in a browserlike window that tiles alongside your Office application, so you can see both at once. The infamous talking paper clip and other Office Assistant characters are more entertainingly animated than before, and cutesy-phobes can now choose to shut them off altogether. **THE VERDICT:** A modest improvement over Office 97's help, but the beta version's help was exceedingly slow and didn't always work correctly.

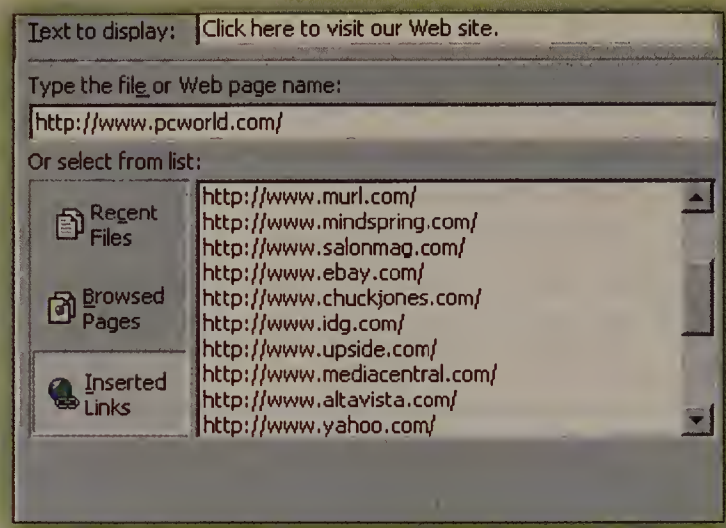
Personalized Menu System

WHAT IT DOES: Menus show only most-used items; you hover the mouse to see the full selection. As you use features, they get added to the top level. **THE VERDICT:** Personalized menus are supposed to reduce menu clutter, but here the cure's more confusing than the disease—especially for users familiar with Office's old (and still available) menu system. Office vets probably won't use the new system. —Harry McCracken

lowing you to quickly find an appropriate look. Thanks to a Word-exclusive tweak, thesaurus junkies needn't rummage through the menu; right-clicking on any word provides a list of alternatives.

WordPerfect already boasts similar features. But Word 2000's revised automatic spell-checking engine beats the competition's. Today's word processors can correct only simple typing mistakes (such as "hte") on the fly. Word 2000 fixes more complex typos such as "sracastic" and "perpednicular."

You'll find other handy improvements, as well. Word's slick interactive table-drawing tools enable you to divide cells into diagonal halves and easily erase part or all of a table. You can also wrap text around a Word table, wrap text within a table cell around a graphic (Word Pro and WordPerfect already permit this), and use any graphic—your company's logo, for example—as a bullet.



WORD 2000 includes much-improved hyperlink options that let you specify URLs to link to, through your Web browser.

WORD ON THE WEB

WORD 2000 now outshines other word processors in replicating richly formatted documents for the Web. These pages look good in versions 4.0 and higher of Internet Explorer and Netscape Navigator. Pages open in older browsers but may lose some formatting—and multicolumn Word documents appear as single-column Web pages in all browsers.

To speed up Web-page creation, a menu item enables you to quickly preview a page in progress in your default browser. Word 2000 steals FrontPage's "theme" concept, allowing you to automatically format a Web page with coordinated fonts, colors, and graphics.

Web Folders, a new feature Microsoft has included in most Office 2000 applications, makes Web page management a snap, too. Now, posting pages to a Web server in .doc or HTML format is as simple a matter as saving files to the appropriate directory on your hard disk.

Watch out for pitfalls, however. Web

OFFICE 2000 THE EDITIONS AND THEIR APPS

VITAL STATS	Standard Edition	Small Business Edition	Professional Edition	Premium Edition	Developer Edition	Comments
List price (upgrade[1]/full)	$249/ $499	$249/ $499	$349/ $599	$499/ $799	$649/ $999	Office 2000 costs significantly more than competitors Corel WordPerfect and Lotus SmartSuite.
Required disk space	189MB	360MB	391MB	526MB	656MB	Space needed for typical installation of apps in each suite; see www.microsoft.com/office/preview for full system requirements.
APPLICATION Upgrade[2]/full price						Pros and cons
WORD 2000 $85/$339	●	●	●	●	●	Only one big change: tools for easy Web authoring; nice tweaks, especially to spelling checker. HTML files in other editors hard to open.
EXCEL 2000 $109/$339	●	●	●	●	●	No revolutionary innovations; new built-in HTML format and better PivotTable tools for easier chart design. HTML files require a lot of disk space.
ACCESS 2000 $109/$339	○	○	●	●	●	Many useful additions for creating database apps, making Web pages, and locking records. Can't save design changes if others are using database.
OUTLOOK 2000 $109/$109	●	●	●	●	●	Dramatic redesign from Outlook 97 makes PIM faster and easier to learn; better e-mail integration. Application still too complex for some users.
FRONTPAGE 2000 $60/$149[3]	○	○	○	●	●	Several tweaks: Better interface for page management; refined design tools give more flexibility. Connecting to other apps is still difficult.
POWERPOINT 2000 $109/$339	●	○	●	●	●	Sensible additions include an expanded three-window view and auto-formatting features. Viewing presentations in Navigator a major hassle.
PUBLISHER 2000 $100/$100[4]	○	●	●	●	●	App now included in most Office versions; slick new templates and features for printing documents professionally. Still lacks some high-end tools.
PHOTODRAW 2000 none/$149[5]	○	○	○	●	●	Lets amateurs produce flashy graphics for print and the Web. Nonstandard user interface and steep hardware requirements.
SMALL BUSINESS TOOLS not sold alone	○	●	●	●	●	Additional unspecified tools for small-business owners; package not available for our review.
PROGRAMMING TOOLS not sold alone	○	○	○	○	●	Tools for developers who build custom Office applications; package not available for our review.

● Yes ○ No

[1] Upgrade prices (available to users of Microsoft Office and competitive suites) do not include rebates for current Office users ($50 for Premium Edition, $40 for others).

[2] Upgrade prices available to users of Microsoft Office applications and other programs that compete with Office apps.

[3] $40 rebate for Office users.

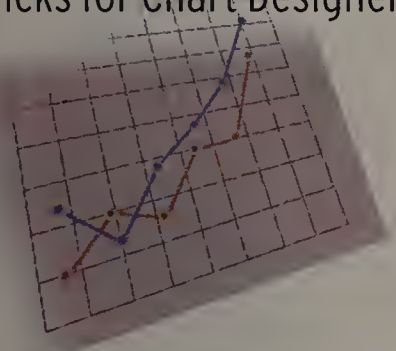
[4] $20 rebate for Publisher users.

[5] $40 rebate for users of Office, FrontPage, or CorelDraw.

Folders work only if your Web server is running Microsoft's FrontPage Server Extensions—a rarity among cheap dial-up ISP accounts. We also had some trouble opening Word's HTML files in other Web editors (see "Compatibility Conundrum: Frustration With File Formats," page 112). And if you sometimes need to hand-edit HTML, the elaborate HTML code created by Word—which is necessary to preserve fancy formatting—could throw you for a loop. As we go to press, Microsoft says the shipping version of Word 2000 might include a tool capable of creating less-sophisticated and easier-to-interpret HTML files.

Excel 2000

Tricks for Chart Designers



What's hot: Built-in HTML format for Web pages, PivotTables and charts made easy. **What's not:** Saving in HTML creates multiple files and takes exorbitant disk space.

IF YOU'RE AN HTML shark who posts spreadsheet data on the Web, or a PivotTable addict frustrated with Excel's limitations, consider moving to Excel 2000. Its key enhancement lets you save files in HTML as a native file format, and a pivot chart feature is a welcome addition to Excel's arsenal. But typical users aren't likely to notice these improvements and probably shouldn't bother upgrading.

If you create HTML pages from Excel workbooks, Excel 2000 could impress you. HTML-formatted saves are now built in, with two options: You can save for viewing only or save for interactivity.

The first option creates a document that's viewable in recent versions of Internet Explorer and Netscape. The second creates an interactive Web page viewable only with Internet Explorer 4.01 or later and Office 2000; Netscape Communicator users are left in the cold.

Saving noninteractive files requires a lot of disk space. This option creates a main document plus a big subdirectory of supporting files. In one test, an 84KB, four-sheet workbook required nine files totaling 210KB when saved in HTML.

When you distribute interactive files or post them to a Web site, you need to ensure that all ancillary files transfer, too. If any one of the supporting files gets lost or damaged, Excel 2000 can't open the workbook. And don't save in HTML format without a good reason; the normal .xls format is faster and more compact.

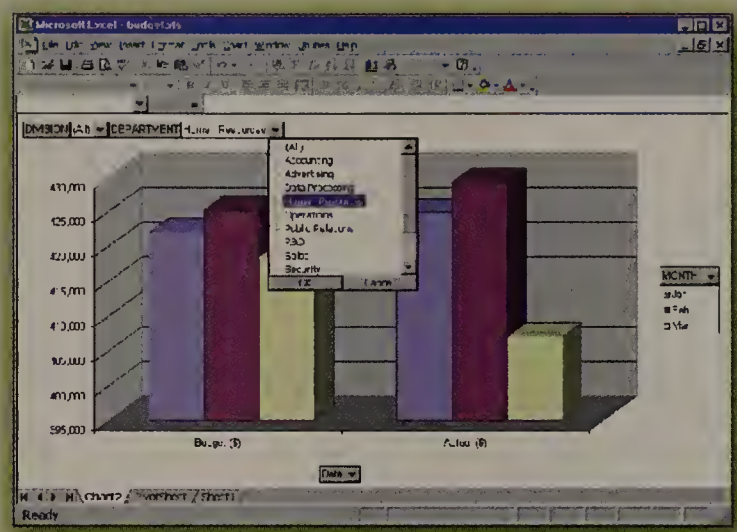
Publishing an interactive worksheet lets a user open the document from within a Web browser and change cells, charts, or PivotTables. In general this feature works quite well, but you may be in for some surprises. Your 3D charts convert to normal 2D charts, and many customizations are lost. When you import additional items and republish, the new items are always appended to the bottom of the document, not in the location where you originally placed them. To increase control over appearance, you need to use Microsoft FrontPage to edit the document.

PIVOT CHARTS MADE EASY

EXCEL'S PIVOTTABLES—which let you summarize massive amounts of data in just about any way imaginable—have always been a mixed blessing. For instance, making a bar chart from a PivotTable of data was rarely easy: If you changed the table's structure, you usually had to adjust the chart manually.

With Excel 2000, one click is all it takes to link a chart directly to a PivotTable. When you change the structure of the PivotTable, the chart adjusts automatically. Or you can work with a pivot chart directly—drag fields around, add new ones, and more. But you have less control over formatting the pivot chart than you get with a standard chart, and Excel 97 users who open the file can't take advantage of this slick feature.

Excel 2000 also makes designing a breeze. In previous versions, customizing a PivotTable was a chore—especially when you changed the structure of the table, and the formatting no longer applied. But no more: Excel 2000 supports a dozen PivotTable autoformats.



EXCEL 2000'S NEW FEATURES greatly reduce the time and struggle involved in making charts from PivotTable data.

SMALL TWEAKS

THE ENHANCED clipboard in Office 2000 apps proves particularly useful in Excel 2000. Users of previous versions frequently complained that pasting a cell or range of cells wiped out the clipboard. Happily, you can now paste as many copies of a range as you need and store multiple objects on the Office clipboard. This feature has one potentially serious problem, though: In our tests, pasting a range of cells to the Office clipboard inserted only the values, not the formulas. (Microsoft insists that the program does copy both values and formulas.)

Users who apply lots of color formatting will appreciate a significant cosmetic change: New transparent cell highlighting does not obscure background and foreground colors in the selected cells, as in previous versions of Excel. ▶

PREVIEW

Access 2000

Big Win for Experts

What's hot: New subdatasheets feature allows you to view related records from a datasheet; Access can function as a front end for Microsoft SQL Server data.

What's not: You can't change the design of a database that others are using.

MICROSOFT HAD expert users in mind when making significant improvements to Access 2000 that expand the program's Web publishing and SQL Server database capabilities. Meanwhile, casual users will find Access 2000's small tweaks helpful, but not essential.

TOOLS FOR PROS

DEVELOPERS WILL benefit from the database's newfound ability to function as a front-end tool for working with Microsoft SQL Server data. This enhancement will let experts use Access as a tool for creating database applications when data is stored on the server.

Access 2000 also boasts more-sophisticated Web tools. The last version of Access let you publish data to the Web, but you couldn't view the resulting Web pages from Access. With Access 2000 you can operate directly from an Access database to open and browse Web pages that show Access data; Internet Explorer 5.0 shares this data-viewing capability.

A new Page Wizard helps create ▶

Compatibility Conundrum

Frustration With File Formats

WHEN MICROSOFT introduced all-new file formats in Office 97, the change created compatibility headaches for early adopters who shared documents with Office 95 users. Consumers hit the roof. This time around, the company has done much more to keep file formats consistent. You could still run into trouble, however, if you delve into Office 2000's much-hyped pervasive HTML support.

Office 97 Formats Return

WORD, EXCEL, AND POWERPOINT users can rest assured: The native file formats of their applications haven't changed. In our tests, juggling files between versions of these programs went smoothly; Office 97 opened all our Office 2000 files, and features that the older version didn't support degraded gracefully: Customized bullets in PowerPoint 2000 displayed as standard bullets when we opened the file in PowerPoint 97. Simple Word 2000 and Excel 2000 documents also opened properly in Lotus SmartSuite and Corel WordPerfect Suite, though these applications had some difficulty with richly formatted files.

Data exchange proves trickier with Access 2000. The new database can open Access 97 databases for viewing and data entry, but using this process disables new Access 2000 features and prevents you from modifying the database's design. To do so, you must first convert the database to Access 2000's new file format. And although a new export feature lets you convert an Access 2000 database for use in Access 97, the job requires that you own and install *both* versions of the software. Bottom line: If you're working with shared databases and plan to upgrade, you will probably want to do it in one fell swoop.

Netscape? No

OFFICE 2000 treats HTML as a companion file format, supporting it so thoroughly that you can opt to save documents in HTML exclusively. Judging from our experience with the Office 2000 beta, however, users who do so should gird themselves for a variety of compatibility hang-ups, most of which stem from the suite's use of technologies such as ActiveX and XML to preserve formatting.

One major snag occurs in PowerPoint: Its default HTML files display only in IE 4.0 and above. (Users of Navigator and earlier versions of IE get an error message.) Web pages created with interactive components available in Excel and Access are more limited still. They display only in IE 4.0 and above, and the PC must have Office 2000 installed.

Word and noninteractive Excel pages aren't so persnickety—in our tests, they worked fine in both major browsers. However, these files sometimes didn't open properly in popular Web editors such as SoftQuad's HotMetal Pro, Symantec's Visual Page, and even Office 2000's own FrontPage. Similarly, Word 2000's HTML didn't load correctly in Word 97, WordPerfect, or Word Pro. Compatibility between Microsoft products should be smoother by the time the suite ships, according to the company. But even then, the company says, Office's HTML features are intended primarily for users who will create Web pages solely within the suite's own walls. —Harry McCracken

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simple Web pages in which you can edit table data. The wizard will also set up pages with data in a hierarchical format, although you can't edit data online.

END-USER IMPROVEMENTS

NEW FEATURES for casual users include Name AutoCorrect, which automatically tracks and updates name changes to database objects. The subdatasheets feature, another innovation, lets you view records in related tables from a datasheet view.

Access aficionados complain about the way it locks records. Older versions of the program automatically lock an entire page of records—possibly including other users' data—when you lock an individual record. To fix this problem, Access 2000 locks only one record at a time.

Database replication has improved, too. Before, you couldn't update Microsoft SQL Server data using Access data. Now changes to Access data can be replicated to a Microsoft SQL Server database. And if conflicts arise when you synchronize data from different replicas, a wizard can help sort things out.

A STEP BACKWARD

AS YOU CONSIDER upgrading, be aware that Access 2000 no longer lets you save changes to design objects like tables, forms, and reports when more than one person is using a database. Multiple users working on objects in the same database will have to devise a workaround, such as using separate copies of the database and importing the changes into a master copy.

Outlook 2000

Still Powerful, Getting Friendlier

What's hot: Easier-to-use PIM, slick integration between e-mail and other features.
What's not: Still more convoluted than Lotus Organizer, no support for Office 2000 Web folders, clunky newsgroup support.

A LABYRINTHINE interface, sluggish performance, and programming glitches marred Outlook 97. Outlook 98 fixed many of the worst problems, and the newest version adds other nice refinements, making it a compelling upgrade for any Outlook 97 users.

Outlook 2000 melds e-mail, calendar, address book, and a dash of file management capabilities into one versatile package. Ultimately, all this power remains a little intimidating; if you just want a simple calendar and address book, SmartSuite's Organizer is the more inviting PIM.

MAIL AND MORE

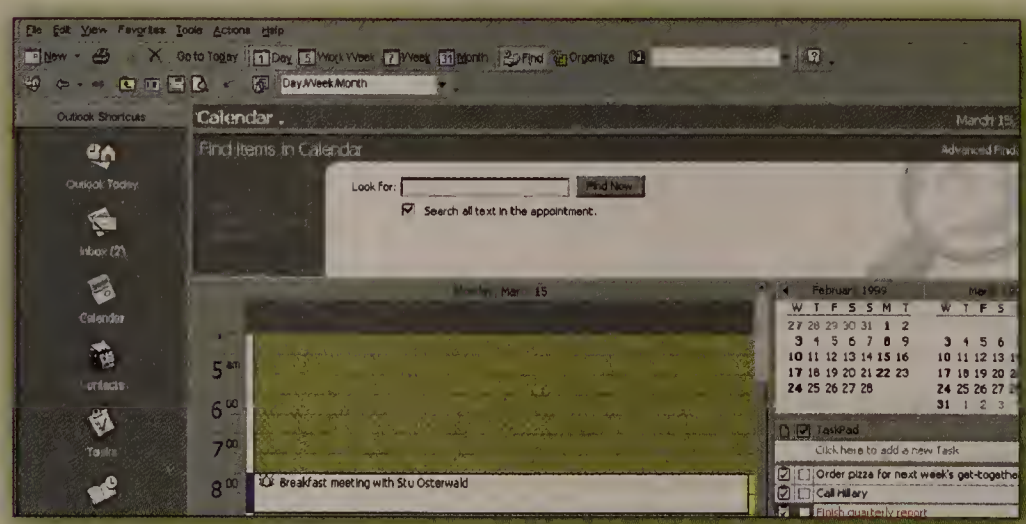
WHILE OUTLOOK's rich offering of features will keep you organized, the application is a full-fledged e-mail package at heart; it works with Internet service provider e-mail accounts, but it also supports Microsoft's Exchange and other corporate e-mail systems. Its e-mail features haven't changed much in the newest version, but they were impressively revamped in Outlook 98: You get potent search tools, rules for automating message handling, templates for producing attractive HTML-formatted mail, and lots more. Oddly enough, however, the package still doesn't support integrated reading of Internet newsgroups. (Instead, it launches a special version of Outlook Express to do the job.)

Outlook's cross-pollination of e-mail with PIM features has always set it apart, and the new version goes even further. Each contact record in the address book, for instance, now includes a section that summarizes all Outlook information related to that person, including e-mail messages as well as appointments and tasks. When you're working in e-mail, the calendar, or elsewhere, you can use a new search window to quickly pull up a contact record; and you can browse the Web or your corporate Intranet from within the program, since it serves as a front end to Internet Explorer.

STILL NEEDS WORK

MICROSOFT HAS done much to reduce the interface clutter that hobbled Outlook 97. Menus have become more concise, and many tools sport a simpler, Web-style design. But figuring out how to add a custom field to the address book remains just about impossible. And Outlook isn't meaningfully integrated with the suite's new Web Folders feature, which gives other Office apps easy access to files on a Web server.

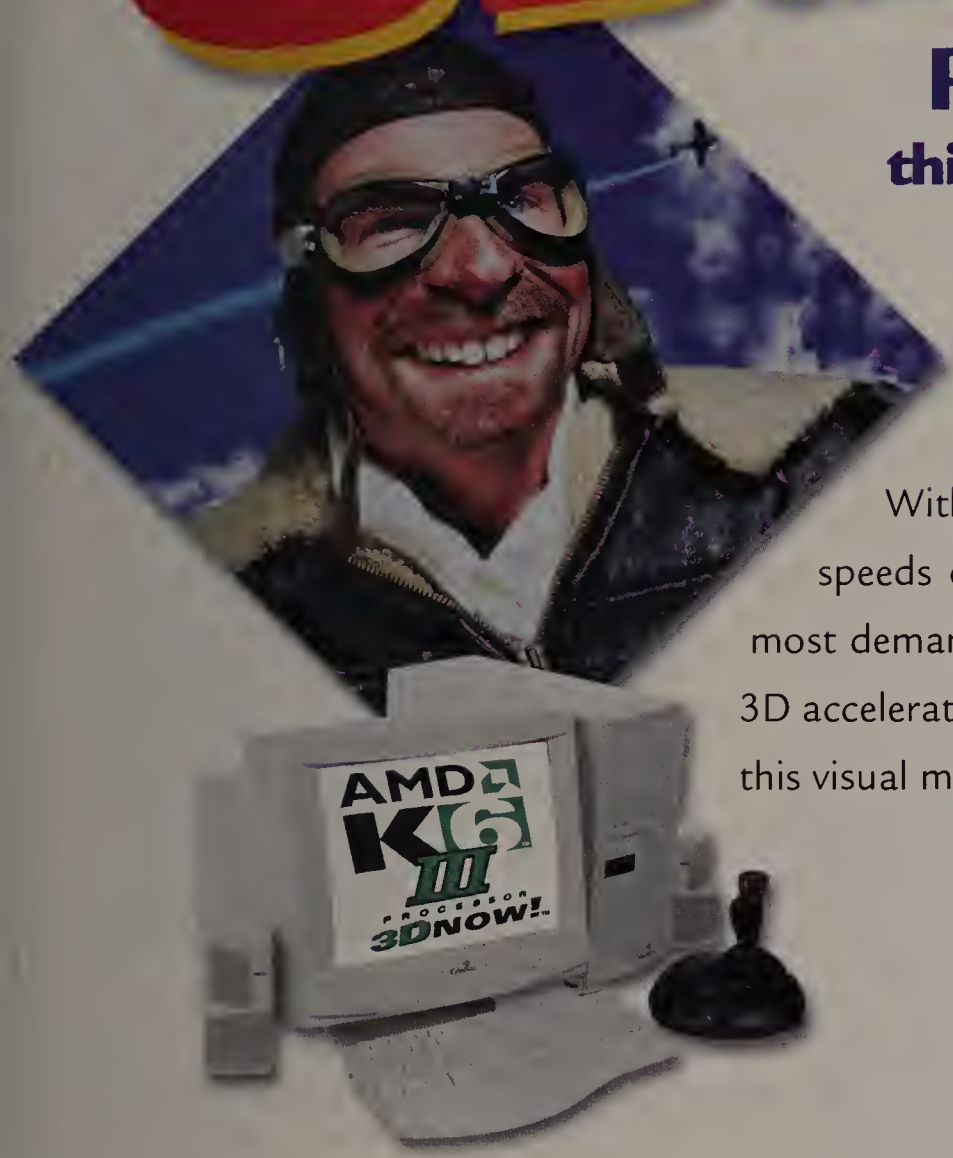
So while we like much of what we see in this upgrade, it still feels like a work in progress. Our hunch is that Microsoft will continue to tinker with the program until it gets everything right—as the client software for the Exchange groupware server, Outlook is a product of uncommon strategic importance to the company. For now, though, Outlook 2000 is an essential upgrade for anyone who's still using Outlook 97. ▶



OUTLOOK 2000's interface is sleeker and friendlier but still too cluttered.

CyberMax Presents

3Daredevils



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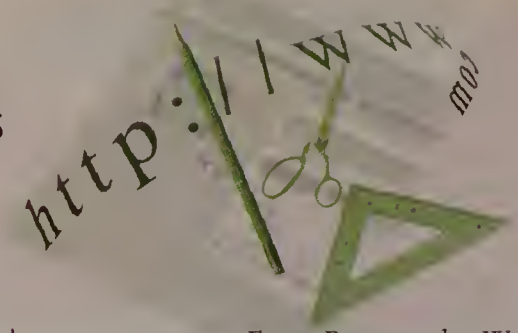
PREVIEW

FrontPage 2000

More Flexibility for Designers

What's hot: More control over text styles, colors, and graphics; easier page management.
What's not: Despite improvements, connecting pages to a database should be simpler.



FRONTPAGE HAS ALWAYS been like a nagging little brother who wants to join the game. With its latest upgrade, FrontPage 2000 now rightly takes its place as a full-blown member of the Premium Office team. Improvements to FrontPage make Web work less burdensome, though you can do almost everything in FrontPage 98 that you can do with FrontPage 2000. So unless you are a hard-core FrontPage user, upgrading isn't a pressing matter.

FrontPage's timesaving abilities, which let you quickly build and reorganize handfuls of pages, set it apart from other page editors. FrontPage 2000 makes other tasks less troublesome, too. Combining Page and Explorer views into one interface means you no longer have to jump back and forth so much. (Formerly, you had to work on a site in the Page view and tediously switch to the Explorer view to organize pages.)

FrontPage 2000's "themes"—matching sets of text styles, canned graph- ▶

SmartSuite and WordPerfect Users

Fight or Switch?

THE EASIEST, most useful office suite is usually the one you already know. Once you're comfortable with any suite's look, feel, and features, the learning curve involved in migrating to another product is as much of an impediment as the cost of the software.

Still, considering that Microsoft's Office commands the lion's share of the suite market, Lotus SmartSuite and Corel WordPerfect Suite users may wonder whether now's the time to join the Microsoft majority. Assuming you're essentially happy with your current suite, the answer is probably no. Nothing in Microsoft Office 2000 radically changes the officeware landscape. And both Corel and Lotus are readying upgrades designed to keep their customers productive in a Microsoft-dominated world.

WordPerfect Hits 2000

FOR WORDPERFECT aficionados, the most intriguing Office 2000 on the horizon isn't the one from Microsoft—it's WordPerfect Office 2000, the next upgrade to WordPerfect Suite 8. We tested an early prerelease version. Though the beta was rough, the suite looks promising. It's expected to ship in May and will cost $99 for a upgrade to the standard edition, less than half of the $249 you'd spend to switch to Microsoft's.

Corel doesn't plan a massive overhaul of the suite's Web features, but it is adding Trellix's Web-publishing application to the fold. In our tests, Trellix turned raw WordPerfect documents into good-looking Web pages, automatically dressing them up with fonts, colors, and navigational buttons that broke long documents into manageable chunks. Users who create lengthy or technical documents—long a WordPerfect specialty—will benefit from some other improvements, including the ability to sift quickly through documents by jumping directly to elements such as tables or footnotes. The RealTime Preview feature, used throughout the suite, conveniently shows how prospective changes to fonts, alignment, and other formatting would affect a document's look.

Other features help with collaboration between Microsoft's suite and Corel's. WordPerfect and Quattro Pro users will be able to use Word's .doc and Excel's .xls as their default file formats, and Presentations will open PowerPoint slide shows. Corel says the suite's applications will also import files from their Microsoft counterparts with greater fidelity. We weren't able to verify this; the beta version still choked on many Office 97 and Office 2000 files.

SmartSuite Gets Wise

USERS OF SMARTSUITE'S current Millennium Edition will have to sit tight for a while—Lotus hasn't nailed down its schedule for the next major version. The company says that one highlight will be a new version of FastSite, a unique application for rapidly assembling word processing files, spreadsheets, and other documents into a Web site. Lotus also plans to improve compatibility with Microsoft Office 2000.

SmartSuite remains the only suite that has voice recognition as a standard feature. Lotus says the upgrade will add more practical, task-based voice features, similar to the current edition's voice-enabled expense report template in 1-2-3. The company also plans to give the entire suite's user interface a makeover—a wise decision given that the present one looks a tad outdated. Lotus says that the upgrade may be available by the middle of this year, but the company might delay it in favor of an interim release containing some but not all of the features discussed here. —Harry McCracken

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ics, and background colors—give you more flexibility. Though you could choose from 50 different themes and adjust them slightly in previous versions of FrontPage, you couldn't easily alter the color, graphics, and text.

FrontPage 2000 allows you to pick your site's colors from a color wheel or palette or use an eyedropper tool to pull a color from your company's logo or any other image. You can also mix and match type styles, backgrounds, headlines, and body text. The ability to change themes is a subtle but welcome improvement for Web developers who want to differentiate their site from all the others created with FrontPage.

Another refinement provides more control over where to position images on a Web page. In earlier versions of FrontPage, you could place graphics only in the most rudimentary positions (left, center, or right), a major limitation.

FrontPage 2000 lets you lay images and text anywhere on the page, though your visitors will need a 4.0 browser that supports Cascading Style Sheets. ▶

Teamwork Tools

Good Idea, Bad Execution

WORKGROUP software can be like dental floss: Everyone agrees it's a good idea, but few bother to use it. In theory, adding workgroup tools to the familiar office suite could help. But though some new Office 2000 features can help you and coworkers collaborate productively, we found others too clunky to promote true teamwork.

Intranets can be a teamwork tool, and now that Office sports improved features for creating and publishing Web pages, the suite can serve as an intranet-in-a-box. Converting Word and Excel documents into Web pages is a nearly transparent process; when it's time to update them, you can simply open the HTML files directly from the intranet's Web server, make changes, and save them. Office 2000 automatically provides your intranet with a start page, browsable document directories, and a search engine—all usable in both Internet Explorer and Navigator.

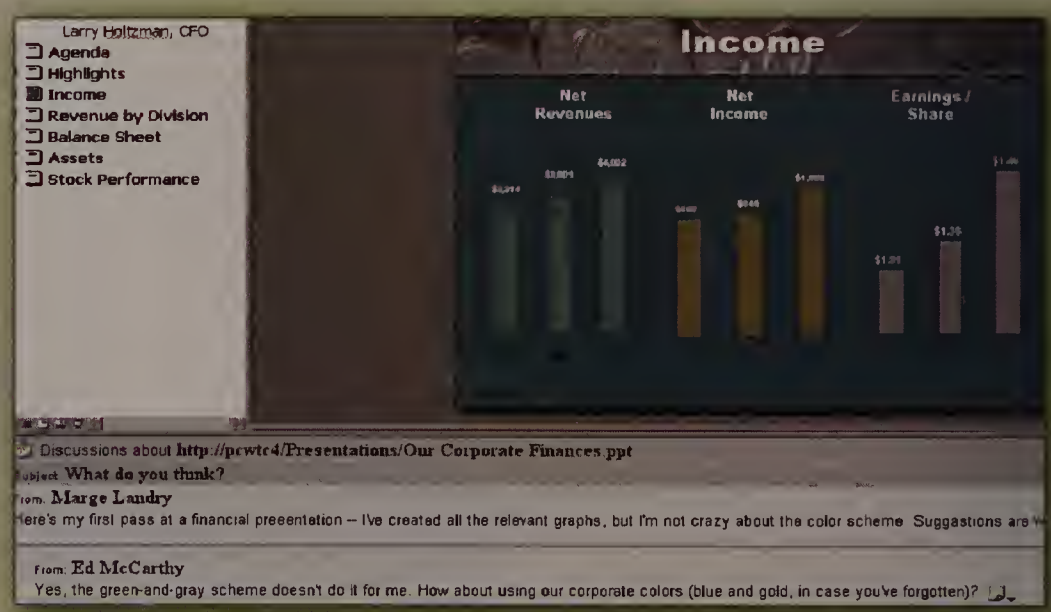
Team Leader Needed

BUT DON'T FIRE your networking guru just yet. Though Office's Web tools can remove the hassle from day-to-day intranet maintenance, initial setup of a Web server is still best left to an expert. Neither does Office provide a way to restrict access to certain sections of the intranet (say, employee compensation files), or let some users view documents but not change them. Office includes two other major Web-based collaboration tools: *discussions* and *subscriptions*. The former, threaded message boards that appear within shared Office documents, serve as an alternative to revision marking and comments. You can participate in a document's discussions in either the originating application or a Web browser, but the document must be stored on the network—the message thread disappears if you put it on a floppy or a non-networked laptop or if you send it by e-mail. Subscriptions let you sign on to a discussion, document, or folder on an Office intranet; once signed on, you get immediate, daily, or weekly alerts when anything changes.

Not on the Same Page

BUT DESIGN FLAWS make these tools hard to use. Just determining that discussions are happening is a challenge, since you can't tell whether they're active unless the discussion toolbar is open. And you can't alert appropriate coworkers that you've initiated a discussion; they'll have to open the document themselves and then subscribe to it. Office e-mails its subscription notifications in HTML format, so users with text-only e-mail will have to fire up a browser to read them. Once opened, notifications refer to most documents not by their file names but by using the entry from Office's little-used Title field; unless everybody involved enters Titles scrupulously, Word fills in the field with the first few words of the document, and as a result you could have trouble telling what document you're being notified about.

Tools that make teamwork tough are the last thing you need. —Harry McCracken



OFFICE 2000's threaded discussions, designed to promote teamwork, are difficult to use.

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WORKING TOGETHER

FRONTPAGE 2000's improved integration with other Office components is another helpful addition. Suppose that you want to post your store's catalog (stored in an Access database) on the Web. You could do it in FrontPage 98, but not without some serious head-scratching. The upgrade's new database wizard makes the process a five-step affair—easier but still not simple.

PowerPoint 2000

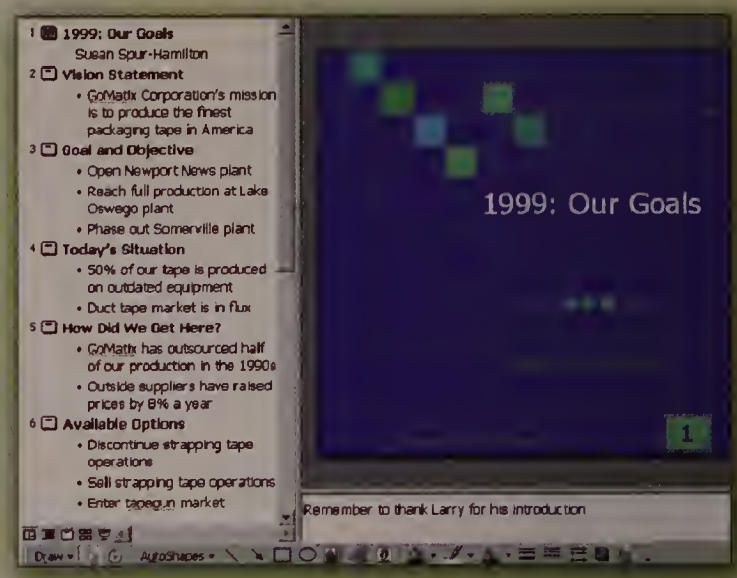
Netscape Fans Need Not Apply

What's hot: Speedier presentation creation and simplified playback.

What's not: Default Web format works only with IE 4.0 and above.

CLEVER CONVENIENCES and some significant browser-related annoyances—that's PowerPoint 2000 in a nutshell. Better editing and playback features give the program a real boost in its perennial competition with SmartSuite's Freelance Graphics for the title of best all-around presentation package. Unfortunately, unless you're creating Web shows for users of IE 4.0 and above, you may find that upgrading isn't worth the trouble.

Microsoft has made one striking revision to PowerPoint's look and feel: The standard view now features a three-window display that shows the current slide, its speaker notes, and an outline of the entire presentation. The integrated interface lets you work on all aspects of a show without jumping between modes. Lots of little changes help with presentations. If you type more text than fits in a frame, the program automatically reduces the font size until it fits. Word-style autoformatting features turn (c) into © and number lists as you enter them. During playback, the application can automatically disable your screen saver, and if you accidentally joggle the mouse, as opposed to really moving it, the pointer won't appear and distract your audience.



POWERPOINT now shows a slide, notes, and outline together.

BROWSER BATTLE

POWERPOINT'S NEW 'Save as Web page' creates Web presentations that are the spitting image of shows saved in PowerPoint's native file format: Transitions, animations, audio, and video clips are all retained, and presentations can run in full-screen mode. Alas, all this is true only if users look at the presentations in IE 4.0 or above; try viewing them in any version of Navigator, and all you'll get is an error message. You can still save Web presentations in a less-faithful HTML format that works with other browsers, or in a hybrid form that displays a fancy show in IE 4.0 and a more basic one in other browsers. But using these two optional formats is a hassle, since PowerPoint itself can't open files saved in the first of these two alternatives, and neither format can be set as the default.

To be fair, PowerPoint's inability to create a full-blown Web presentation that works equally well in all browsers is related to Navigator's deficiencies (it doesn't support ActiveX). However, the program's irksome assumption that you want to create IE 4.0–only shows is Microsoft's fault alone; the package badly needs a wizard to steer you through the whole Web publishing process. (PowerPoint 97 had one, but it's gone.)

Presentation broadcasting, another new Web feature, is nifty in concept but not in execution. You can conduct a presentation over your company's local area network so disparate users can view the show in their browser as you give it. Viewing such a presentation also requires IE 4.0 or above, and—a bigger problem—it's tough to use.

The frustrations of PowerPoint 2000's Web-publishing features are such an aberration in an otherwise excellent program that we hope Microsoft doesn't wait for the next major version to fix them. For now, our advice comes with plenty of caveats: You'll probably be pleased with the new version if you don't use Web publishing or if you have a captive audience of IE 4.0 users. But if any Netscape Navigator or IE 3.*x* users figure in your presentation plans, you may find PowerPoint 2000 an unlovable upgrade despite its many virtues.

Microsoft Office 2000
Microsoft; 800/426-9400; www.microsoft.com/office
PRODUCT INFO NO. 736

Harry McCracken is a PC World *senior writer, John Walkenbach is a contributing editor, and Paul Heltzel and Celeste Robinson are frequent contributors. Testing performed by Robert James of the PC World Test Center.* ■

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Business lease: $35/Mo. Order Code #pcw0405

- ■ Intel® Celeron™ Processor 400MHz
- ■ 64MB SDRAM Memory
- ■ 128KB Secondary Cache
- ■ 6.4GB Ultra ATA HD
- ■ 3.5" 1.44MB Floppy Drive
- ■ 15" Digital Monitor (13.8" viewable)
- ■ 64-bit 3D AGP Graphics Accelerator w/4MB
- ■ 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ▲ *New* 40X Max Variable Speed CD-ROM Drive
- ■ *New* 128-bit Voice PCI Wavetable 3D Sound & Speakers
- ■ Quantex highly-expandable ATX Mid Tower Case
- ■ 104-Key Keyboard with MS Mouse
- ■ MS Windows 98
- ■ Corel WordPerfect Office Suite 8 w/Value Bundle
- ■ 3-year limited warranty with 1-year On-Site Service**
- ▲ Year 2000 Compliant
- ■ *Upgrade to 17" Digital Monitor (15.8" viewable), add $79*
- ■ *Optional Internal Zip Drive w/one cartridge, add $79*

QP6/366 M-1c(w/Intel Celeron processor 366MHz).....$949

QP6/350 M-2x $1299

Business lease: $46/Mo. Order Code #pcw0406

- ■ Pentium® II Processor 350MHz
- ■ 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- ■ 10GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- ■ 17" Digital Monitor w/DSD (15.8" viewable)
- ■ Toshiba MPACT2 3D/DVD Media Accelerator w/8MB
- ■ 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ■ 3rd-Generation 4.8X DVD-ROM Drive
- ■ SoundBlaster AudioPCI Wavetable 3D Sound
- ■ Altec-Lansing ACS-90 Speakers
- ■ Quantex highly-expandable ATX Mid Tower Case
- ■ 104-Key Keyboard with MS Mouse
- ■ MS Windows 98
- ■ Corel WordPerfect Office Suite 8 w/Value Bundle
- ■ 3-year limited warranty with 1-year On-Site Service**
- ▲ Year 2000 Compliant
- ■ *Upgrade to Altec Lansing ACS-45.1 PowerCube Speakers with Subwoofer, add $49*
- ■ *Optional Internal Zip Drive w/one cartridge, add $79*

OP6/366 M-2c(w/Intel Celeron processor 366MHz).....$1199
QP6/400 M-2(w/Pentium II processor 400MHz).....$1399

QP6/500 Best Buy $1999

Business lease: $70/Mo. Order Code #pcw0408

- ▲ *New* Intel® Pentium® III Processor 500MHz
- ▲ 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- ■ 13GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- ■ 19" Monitor (18.1" viewable), 1600x1200, .26dp
- ■ Intel740 3D 2X AGP Graphics with 8MB SDRAM
- ■ 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ▲ 3rd-Generation 4.8X DVD-ROM Drive
- ■ Sound8laster AudioPCI Wavetable 3D Sound
- ■ Altec-Lansing ACS-90 Speakers
- ■ Quantex highly-expandable ATX Mid Tower Case
- ■ 104-Key Keyboard with MS Mouse
- ■ MS Windows 98
- ■ Corel WordPerfect Office Suite 8 w/Value Bundle
- ■ 3-year limited warranty with 1-year On-Site Service**
- ▲ Year 2000 Compliant
- ■ *Optional Internal Zip Drive w/one cartridge, add $79*
- ■ *Upgrade to 3Dfx Voodoo Banshee 16MB Graphics, add $49*
- ■ *Add Sony CD-RW Drive for $299 (24X CD/4X CD-R/ 2X CD-RW)*

QP6/450 Best Buy(w/Pentium III processor 450MHz)..$1799

QP6/500 SM-4x $2399

Business lease: $84/Mo. Order Code #pcw0423

- ▲ *New* Intel® Pentium® III Processor 500MHz
- ▲ 128MB PC100 SDRAM Memory (up to 384MB Max.)
- ■ 512KB Secondary Cache / Intel 440BX AGPset
- ▲ *New* 17.2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- ▲ *New* 19" Monitor w/Diamondtron Natural Flat CRT *Revolutionary flat-faced CRT Technology* (18" viewable), .25dp
- ▲ *New* 3Dfx 128-bit Voodoo Banshee 3D AGP Video w/16MB Based on award-Winning Voodoo2 3D Technology
- ■ 56K V.90 PCI Fax/Modem* w/Voice Mail and Speakerphone
- ▲ *New* 6x DVD-ROM Drive
- ▲ *New* Aureal Vortex 2 320-Voice A3D Wavetable Sound
- ■ Altec-Lansing ACS-45.1 PowerCube Speakers w/subwoofer
- ■ Quantex highly-expandable ATX Mid Tower Case
- ■ MS Natural Keyboard Elite with MS IntelliMouse
- ■ MS Windows 98 & Power Bundle
- ■ MS Office 97 SBE v2.0 *(FREE MS Office 2000 upgrade offer*)*
- ■ 3-year limited warranty with 1-year On-Site Service**
- ▲ Year 2000 Compliant

OP6/450 SM-4x(w/Pentium III processor 450MHz)....$2199

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Quantex notebook caught speeding.

intel inside
pentium® II PROCESSOR

"By far the fastest of all the notebooks here."
— C/Net 01/99

" Not only is [the Quantex I-1410] one of the fastest Pentium-class [Pentium® II processor-based] notebooks we've tested to date, but its specs, battery life, features package, and price are among the best we've seen...Quantex has definitely dotted all of the *i's* on the I-1410." —C/Net Editors' Choice 1/99

Once again, Quantex delivers a notebook that outperforms the best the world has to offer. The Quantex I-Series offers all the bells and whistles of a big desktop, only it's a small laptop. With a *NEW* fast mobile Pentium® II processor 366MHz—featuring Intel's revolutionary 256K performance-enhanced on-die cache technology—removable combo drive for simultaneous use of DVD- or CD-ROM and floppy, and the awesome power of a 12-cell Smart Lithium Ion battery, the Quantex I-Series is playing the lead role to rave reviews.

And if that's not enough, you also get stunning Active Matrix displays up to 15" and ATI AGP 3D graphics accelerators— all the juice you need to flex your multimedia muscle. If you want to see what all the talk is about, call us toll-free or drop by www.quantex.com and get the notebook that's getting noticed.

Big On Screen. Small On Price. Quantex I-Series Notebooks are now available with "XX-Large" 15" displays. Check them out starting at just $2399.

Quantex I-1410 $2799

Business lease: $98/Mo. Order Code #pcw0458

- ▲ *New* Mobile Pentium® II Processor 366MHz
- ▲ *New* 256K Performance Enhanced On-die cache technology
- 14.1" XGA Active Matrix Display
- 64MB SDRAM / 6GB Ultra-ATA Hard Drive
- 56K V.90 Fax/Modem
- Removable Combo 2X DVD-ROM Drive & 3.5" Floppy Drive
- ▲ *New* ATI Rage Lt Pro 3D AGP Video w/8MB
- ▲ *New* ESS 3D Wavetable Surround Sound and Speakers
- Long-Lasting 12-cell Smart Lithium Ion Battery
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98
- ▲ MS Office 97 SBE v2.0 *(FREE MS Office 2000 upgrade offer*)*
- Quantex Deluxe Carrying Case - *Limited time offer!*
- Year 2000 Compliant
- 3-year limited warranty on CPU and Main Memory
- 1-year parts and labor warranty on all other components
- Upgrade to 128MB SDRAM, add $149

Quantex I-1410 w/Pentium II processor 333MHz...$2599

T-SERIES "MOBILE WARRIORS" NOTEBOOKS

Quantex T-1330 $1899

Business lease: $66/Mo. Order Code #pcw0452

- ▲ *New* Pentium® II processor 266MHz
- ▲ *New* 256K Performance Enhanced On-die cache
- ▲ *New Ultra-Thin Design (12.44"x9.84"x1.37")*
- 13.3" XGA Active Matrix Display
- 64MB SDRAM / 4GB Ultra-ATA HD
- 56K V.90 Fax/Modem
- 24X Modular CD-ROM Drive / 3.5" Modular Floppy Drive
- ▲ *New* NeoMagic NMG5 128-bit AGP Video
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98 / Corel WordPerfect Office Suite 8
- Quantex Carrying Case - *Upgrade to Deluxe Carrying Case for $89*
- Year 2000 Compliant
- 3-year limited warranty on CPU and Main Memory
- 1-Year parts and labor warranty on all other components
- *Add Modular Internal Zip Drive for just $149*
- *Add 9-Cell Lithium Ion Battery for just $149*

Quantex T-1330 w/Pentium II processor 300MHz.....$1999

Quantex T-1400 $2499

Business lease: $87/Mo. Order Code #pcw0453

- ▲ *New* Pentium® II processor 366MHz
- ▲ *New* 256K Performance Enhanced On-die cache
- ▲ *New Ultra-Thin Design (12.44"x9.84"x1.43")*
- 14.1" XGA Active Matrix Display
- 64MB SDRAM / 6GB Ultra-ATA HD
- 56K V.90 Fax/Modem
- 24X Modular CD-ROM Drive / 3.5" Modular Floppy Drive
- ▲ *New* NeoMagic NMG5 128-bit AGP Video
- Integrated 16-bit Stereo Sound and Speakers
- Smart Lithium Ion Battery
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98 / Corel WordPerfect Office Suite 8
- Quantex Carrying Case - *Upgrade to Deluxe Carrying Case for $89*
- Year 2000 Compliant
- 3-year limited warranty on CPU and Main Memory
- 1-Year parts and labor warranty on all other components
- *Add Modular Internal Zip Drive for just $149*
- *Add 9-Cell Lithium Ion Battery for just $149*

Quantex T-1400 w/Pentium II processor 333MHz.....$2299

I-SERIES "DESKTOP REPLACEMENT" NOTEBOOKS

Quantex I-1510 $2499

Business lease: $87/Mo. Order Code #pcw0460

- ▲ *New* Pentium® II processor 300MHz
- ▲ *New* 256K Performance Enhanced On-die cache
- ▲ 15" XGA Active Matrix Display
- 64MB SDRAM
- 6GB Ultra-ATA HD / 56K V.90 Fax/Modem
- Removable Combo 2X DVD-ROM Drive & 3.5" Floppy Drive
- ▲ *New* ATI Rage Lt Pro 3D AGP Video w/8MB
- *New* ESS 3D Wavetable Surround Sound and Speakers
- Long-Lasting 12-Cell Smart Lithium Ion Battery
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98
- Corel WordPerfect Office Suite 8
- Quantex Deluxe Carrying Case - *Limited time offer!*
- Year 2000 Compliant
- 3-year limited warranty on CPU and Main Memory
- 1-Year parts and labor warranty on all other components
- *Upgrade from 64MB SDRAM to 128MB SDRAM, add $149*
- *Upgrade from 6GB Ultra-ATA HD to 10GB Ultra-ATA HD, add $299*

Quantex I-1510 w/Pentium II processor 266MHz.....$2399

Quantex I-1511 $3299

Business lease: $110/Mo. Order Code #pcw0461

- ▲ *New* Pentium® II processor 366MHz
- ▲ *New* 256K Performance Enhanced On-die cache
- ▲ 15" XGA Active Matrix Display
- ▲ 128MB SDRAM
- ▲ *New* 10GB Ultra-ATA HD
- 56K V.90 Fax/Modem
- Removable Combo 2X DVD-ROM Drive & 3.5" Floppy Drive
- ▲ *New* ATI Rage Lt Pro 3D AGP Video w/8MB
- *New* ESS 3D Wavetable Surround Sound and Speakers
- Long-Lasting 12-Cell Smart Lithium Ion Battery
- USB and Fast IR Ports / Integrated Personal Touchpad
- MS Windows 98
- ▲ MS Office 97 SBE v2.0 *(FREE MS Office 2000 upgrade offer*)*
- Quantex Deluxe Carrying Case - *Limited time offer!*
- Year 2000 Compliant
- 3-year limited warranty on CPU and Main Memory
- 1-Year parts and labor warranty on all other components

Quantex I-1511 w/Pentium II processor 333MHz.....$3099

Notebook Upgrade Options: ■ Quantex Mini-Docking Station...add $149 ■ 12-Cell Long-Lasting Lithium Ion Battery...add $149 ■ PCMCIA Network Interface Card...add $129 ■ Quantex Deluxe Carrying Case...add $89 ■ Upgrade from 64MB SDRAM to 128MB SDRAM...add $149 ■ Upgrade from 6GB Ultra-ATA HD to 8GB Ultra-ATA HD...add $199

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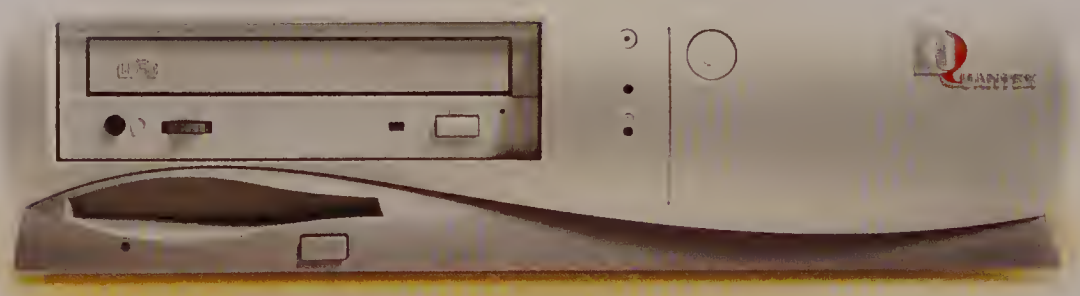
c|net Comdex '98 Coverage



SLIMLINE PCS

Quantex VX-400c $999

Business lease: $35/Mo. Order Code #pcw0473

- Intel® Celeron™ Processor 400MHz
- 32MB SDRAM Memory / 128KB Secondary Cache
- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 15" Digital Monitor (13.8" viewable)
- Intel740 3D 2X AGP Graphics w/8MB SDRAM
- Intel Pro 10/100 PCI Fast Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- ▲ *New* 40X Max Variable Speed CD-ROM Drive
- ESS Solo Wavetable Audio
- ▲ *New* Quantex Slimline Case (12.9"x3.3"x14.2")
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- ▲ QSentry Technology (Including Intel LANDesk Client Manager)
- WfM Compliant, DMI 2.0, ACPI
- 3-year limited warranty with 1-year On-Site Service**

Quantex VX-400 $1899

Business lease: $67/Mo. Order Code #pcw0475

- Intel® Pentium® II Processor 400MHz
- 64MB SDRAM Memory / 512KB Secondary Cache
- 10.2GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- ▲ *New* Quantex 15" LCD Flat-Panel Display
- Intel740 3D 2X AGP Graphics w/8MB SDRAM
- Intel Pro 10/100 PCI Fast Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- ▲ *New* 40X Max Variable Speed CD-ROM Drive
- Creative Labs SoundBlaster Audio
- ▲ *New* Quantex Slimline Case (12.9"x3.3"x14.2")
- MS Natural Keyboard Elite with MS Mouse
- MS Windows 98
- ▲ QSentry Technology (Including Intel LANDesk Client Manager)
- WfM Compliant, DMI 2.0, ACPI
- 3-year limited warranty with 1-year On-Site Service**

Quantex VX-500 $2499

Business lease: $87/Mo. Order Code #pcw0476

- ▲ *New* Intel® Pentium® III processor 500MHz
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- ▲ *New* Quantex 15" LCD Flat-Panel Display
- Intel740 3D 2X AGP Graphics w/8MB SDRAM
- Intel Pro 10/100 PCI Fast Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- ▲ *New* 40X Max Variable Speed CD-ROM Drive
- Creative Labs SoundBlaster Audio
- ▲ *New* Quantex Slimline Case (12.9"x3.3"x14.2")
- MS Natural Keyboard Elite with MS IntelliMouse
- ▲ MS Windows NT 4.0 Workstation
- MS Office 97 SBE v2.0 *(FREE MS Office 2000 upgrade offer*)*
- ▲ QSentry Technology (Including Intel LANDesk Client Manager)
- WfM Compliant, DMI 2.0, ACPI
- 3-year limited warranty with 1-year On-Site Service**

Quantex VX-400 $1399

Order Code #pcm0474

Above system with Pentium II processor 400MHz, 128MB SDRAM, 512KB Cache, 10.2GB Ultra-ATA Hard Drive, 17" Digital Monitor (15.8" viewable) and Creative Labs SoundBlaster Audio.

"If you're in the market for a well-equipped and ready-for-the-future desktop system, give the Quantex QP6/450 SB-4 a serious look... few can match the price/performance ratio offered by this solid PC, and that's good for your business."

Computer Buyers Guide and Handbook (Feb. 99)

BUSINESS DESKTOPS

QP6/366 SB-1c $999

Business lease: $35/Mo. Order Code #pcw0430

- Intel® Celeron™ Processor 366MHz
- 64MB SDRAM Memory / 512KB Pipelined Burst Cache
- 4.3GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- 17" Digital Monitor (15.8" viewable)
- 64-bit 3D AGP Graphics Card with 4MB RDRAM
- Intel Pro 10/100 PCI Fast Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- ▲ *New* 40X Max Variable Speed CD-ROM Drive
- Quantex Highly-expandable ATX Mid Tower Case
- 104-Key Keyboard with MS Mouse
- MS Windows 98
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- ▲ QSentry Technology (Including Intel LANDesk Client Manager)
- ▲ Cable Modem Ready / Year 2000 Compliant

QP6/400 SB-2 $1399

Order Code #pcw0432

Above system with Intel Pentium® II processor 400MHz, 8.4GB Ultra-ATA HD and MS Office 97 SBE v2.0 (FREE MS Office 2000 upgrade offer*)

QP6/450 SB-3 $1699

Business lease: $60/Mo. Order Code #pcw0433

- ▲ *New* Intel® Pentium® III processor 450MHz
- 64MB PC100 SDRAM Memory / 512KB Secondary Cache
- 8.4GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- ▲ 17" Monitor w/DSD & NEC CromaClear CRT (16.0" viewable), 1600X1200 max.resolution, .25dp
- Intel740 3D 2X AGP Graphics w/8MB SDRAM
- Intel Pro 10/100 PCI Fast Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- ▲ *New* 40X Max Variable Speed CD-ROM Drive
- Quantex Highly-expandable ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- ▲ MS Windows NT Workstation 4.0
- MS Office 97 SBE v2.0 *(FREE MS Office 2000 upgrade offer*)*
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- ▲ QSentry Technology (Including Intel LANDesk Client Manager)
- ▲ Cable Modem Ready / Year 2000 Compliant / Windows 2000 Ready

QP6/500 SB-3(w/Pentium III processor 500MHz).....$1899

QP6/500 SB-4 $2299

Business lease: $80/Mo. Order Code #pcw0434

- ▲ *New* Intel® Pentium® III processor 500MHz
- 128MB PC100 SDRAM Memory / 512KB Secondary Cache
- 13GB Ultra ATA HD / 3.5" 1.44MB Floppy Drive
- ▲ *New* 19" Monitor w/Diamondtron Natural Flat CRT *Revolutionary flat-faced CRT Technology* (18" viewable), .25dp
- ▲ *New* Ultra-Fast #9 Revolution IV 128-bit 3D AGP Video w/32MB
- Intel Pro 10/100 PCI Fast Ethernet Controller w/RJ-45 and Wake-On-LAN Technology
- ▲ *New* 40X Max Variable Speed CD-ROM Drive
- Quantex Highly-expandable ATX Mid Tower Case
- 104-Key Keyboard with MS IntelliMouse
- ▲ MS Windows NT Workstation 4.0
- MS Office 97 SBE v2.0 *(FREE MS Office 2000 upgrade offer*)*
- 3-year limited warranty with 1-year On-Site Service**
- 24-hr./7-day Technical Support
- 2 Universal Serial Bus (USB) Ports / DMI 2.0
- ▲ QSentry Technology (Including Intel LANDesk Client Manager)
- ▲ Cable Modem Ready / Year 2000 Compliant / Windows 2000 Ready

QP6/450 SB-4(w/Pentium III processor 450MHz).....$2099

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BY PAUL HELTZEL

Internet Explorer 5

SEARCH AND EXPLORE

Microsoft leapfrogs Netscape with a faster, smarter Internet Explorer. But is it enough to hold off the highly anticipated Communicator 5?

ILLUSTRATIONS BY MATSU

Under the Hood of IE 5

Easy Searching and Navigation

You've come to a crossroads in your computing life. Is it time to upgrade to a new browser—namely, Internet Explorer 5, with its sporty features and visible acceleration—or should you stick with the old (somewhat) reliable browsing software you currently drive? That depends on how much time you spend day in and day out needlessly typing or waiting for pages to download. If those laborious tasks annoy you, you may appreciate IE 5's offerings, including improved AutoComplete for summoning URLs and passwords, a smaller download size, and faster rendering (in our informal tests).

But before you shift gears, a word of warning: For months, the second beta of IE 5 we've been testing has performed admirably. We've seen no major bugs, just lots of little ones. Other users, however, have reported more substantial headaches, including difficulty uninstalling the program. Though we haven't been able to duplicate these problems on our own systems, a Pentium II-300 and a P-133, the notoriously buggy history of last year's model—IE 4—and of browsers in general warrants caution.

Once you know your risk tolerance, it's time to comparison-shop. Here are our recommendations about whether to switch from your current browser (or suite, as in the case of Communicator and its embedded Navigator browser) to IE 5. The bottom line: IE 5, which is free and should be available by the time you read this, is a fine upgrade for certain folks, while other users should simply stay put.

IF YOU'RE RUNNING...

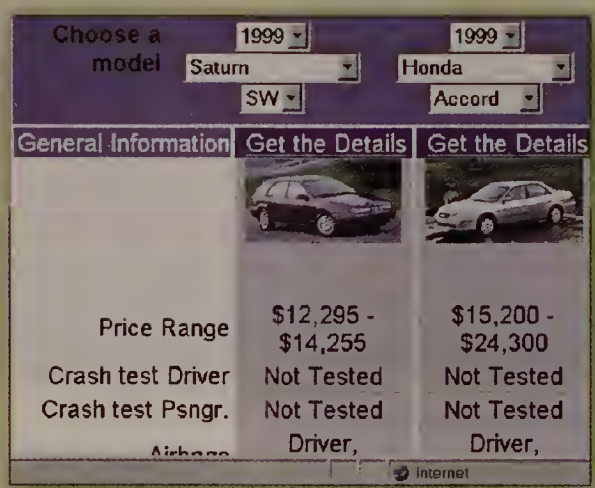
Communicator 4.0x

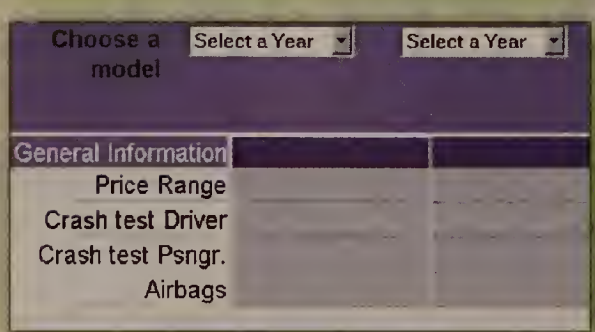
You've got a reliable old workhorse. **With IE 5, you'd get** a smaller footprint and time-saving features. **Should you upgrade?** Yep.

COMMUNICATOR 4.0x had a honey of a browser when it shipped, but times have changed. Space-hogging features like push channels and conferencing tools have gone the way of tail fins. By comparison, IE 5's slim size and customizable features make it worth the upgrade.

To shrink IE 5's footprint, you can instruct it during install to skip components such as the Java Virtual Machine. (The basic install uses just 6.5MB of disk space, compared to 40MB for IE 4.) Later, when you first come upon a Java applet, IE 5 asks if you want to install tools to make the page display correctly.

To reduce repetitive clicking, IE 5 has a feature called persistent states. With it, the program recalls a Web page as you saw it, frames (extra windows) and all, rather than returning to the page's default frame set as both Navigator 4.0x and IE 4 do. As a result, when you use your bookmarks or history list, you won't waste time clicking links and icons to retrieve the exact page you want to see.





◀ **IE 5 STORES THE EXACT FRAME SET you see when you bookmark so that you can retrieve the exact page you want when you return. In this example, the specs on two cars appear with IE 5 (upper left), but are lost with IE 4 (lower left).**

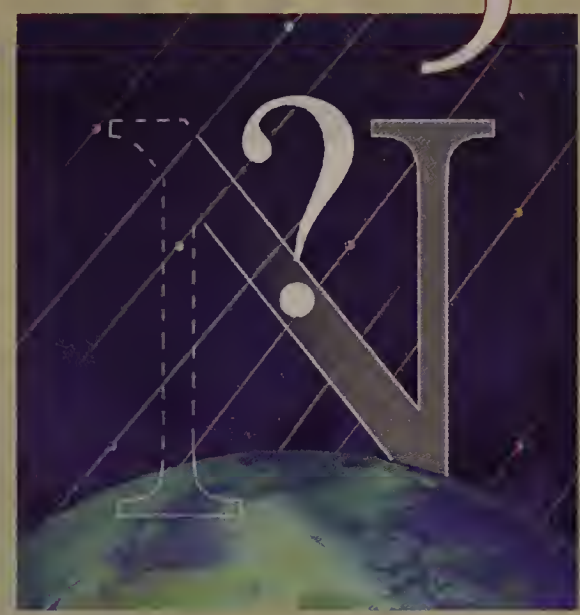
▲ **LONG URLS HAVE GOTTEN EASIER to handle with IE 5. Begin typing the first few letters of a Web address, and a pop-up menu appears. Press the down arrow to cycle through the list and select a site.**

The combination of speed, size, and features make IE 5 the browser to beat. Even so, if you're a die-hard Netscape fan, you might want to hold off until the second quarter of 1999 for Communicator 5 before you download—it has what looks to be a fast new page-rendering engine.

Communicator 5

Coming Your Way

COMMUNICATOR 5 is the best-kept secret on the Net. Netscape has shown its Gecko Browsing engine, which should be faster than version 4.5's engine. It's small—when compressed, it fits on a floppy—and supports Web standards such as HTML 4.0 and extensible markup language, as IE 5 does. The new revision is modular like IE 5, so you can choose which elements to support. Netscape is designing an improved, more intuitive interface but won't say whether it will be a radical change. And because Netscape made its source code publicly available, Communicator 5 will incorporate contributions from developers worldwide. As a result, no one knows what the final version will include, though it should have lots of popular features, such as a version of IE 5's AutoComplete. Sources say a public beta could be available as early as May.



Netscape's merger with America Online probably won't change Communicator anytime soon. Analysts say Netscape will be integrated into the AOL client—as soon as AOL's savvy CEO can make a case for it.

IF YOU'RE RUNNING...

Communicator 4.5

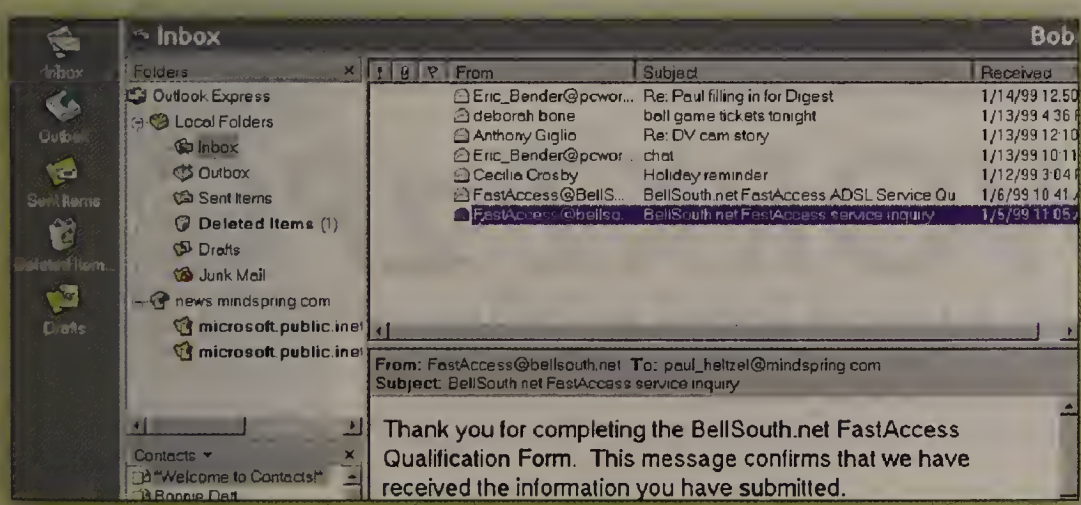
You've got fast searching and a reasonable download size. **With IE 5, you'd get** new search features and AutoComplete tricks. **Should you upgrade?** Yes, unless you're a committed Netscape enthusiast.

MOVING from Netscape's stable Communicator 4.5 is a stickier question. Navigator's Smart Browsing includes such attractive features as keyword searches via the address bar, plus it recommends sites similar to the one you're viewing. You can even refine these features without updating the whole program, since they come from a Netcenter database.

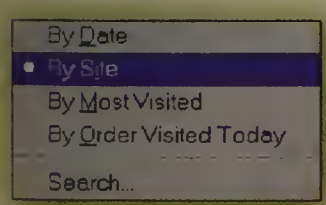
On the flip side, IE 5's AutoComplete is unique. IE 5 stores data from any field you've completed before—such as a password—and brings it up when you revisit the field. You can also summon a drop-down menu of previously visited sites when you type in your address bar.

Microsoft has other tricks up its sleeve. IE 5's new Search Assistant narrows search queries by allowing you to find a Web page, an e-mail or postal address, a company's information, a map, an Encarta encyclopedia entry, or a Dejanews newsgroup posting. The program accesses nine engines when searching, and stores your searches so you can resubmit them later.

So, should you upgrade? As it stands, IE 5 is the better browser. Communicator 5 could surpass IE, but it's been delayed. Even if you're an unrepentant Netscaper, IE 5 should tempt you—at least until Communicator 5 arrives.



▲ UTTERLY CUSTOMIZABLE but somewhat overwhelming, IE 5's interface could use a little slimming down. On the positive side, you can choose which of five panes you want to view, decide how to position them, and remove unneeded toolbar icons.



◀ NEW SORT TOOLS in IE 5 let you easily organize recently visited sites. A drop-down menu sorts sites by date, name, frequency of visit, or date visited; and a new search tool compares the keyword you enter against a record of the domain names and page titles of Web sites you have visited previously.

IF YOU'RE RUNNING...

Internet Explorer 4

You've got a working solution. **With IE 5, you'd get** better file transfers and improved AutoComplete. **Should you upgrade?** Small but worthwhile refinements point to yes.

IF YOU WERE expecting a completely new interface in IE 5, you'll be disappointed. Aside from having dumped ▶

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the channel button and added an AOL-like Go button next to the address box, IE 5 closely resembles last year's model. Look deeper, however, and you'll find significant changes.

IE 5 lets you sort previously visited Web sites by date visited, frequency of visit, or alphabetical order, whereas IE 4 sorted only by date, then alphabetically by domain. More significantly, the IE 5 History pane now includes a text box for searching words in a title or Web address.

Another important difference in this latest version: IE 5 heeds the call of users who don't want their browser to change the look of their operating system, and it doesn't take over Windows 95 the way IE 4 did. Windows 98 lets you browse your desktop files and applications with IE 5, but the only way to get Web integration on Windows 95 with IE is to install the new version *over* IE 4.

Combine the hands-off approach toward your desktop with features to reduce repetitive typing, and it's time to trade in IE 4 for the newer model.

IF YOU'RE RUNNING...

Opera 3.51

You've got a simple, fast alternative browser. **With IE 5, you'd get** the latest features. **Should you upgrade?** No. You chose Opera for a reason—and it's still a good one.

IN THE AGE of free browsers, faithful Opera lovers pony up $35 to register for this nimble shareware application. The program is speedy, simple to use, and small. IE 5's minimum installation is more than three times larger than Opera's. But the compact size of Opera (1.7MB) requires some sacrifices. For example, you won't find fancy add-ons like IE 5's full-featured mail client, Outlook Express. Instead, Opera offers a newsreader, but its mail client is send-only.

Although earlier versions of Opera hiccuped when displaying pages, version 3.51 measures up well against IE 5 in page fidelity. More important, the program performs well on older computers that have little memory. If your needs and your system are low-fi, Opera continues to perform in a class by itself.

IF YOU'RE RUNNING...

AOL, IE 3, or Navigator 3.x or older

You've got the convenience of what you know. **With IE 5, you'd get** cleaner page formatting and speed. **Should you upgrade?** Probably yes, but the convenience of your existing solution may overshadow new IE 5 features.

IF YOU DIDN'T jump for 4.0 versions of Netscape's and Microsoft's browsers, you're probably not lusting after IE 5 either. Maybe you're comfortable with the familiar, or you're thoroughly satisfied with the features you have now. Either way, if you haven't noticed that anything's missing, stay where you are. On the other hand, if you're plagued by JavaScript errors, however, or if you want a browser that can upload files, use the latest standards, and automatically fix commonly mistyped words, Internet Explorer 5 is your ticket to the modern world.

Paul Heltzel is a freelance writer based in Chapel Hill, North Carolina.

Internet Explorer 5
Microsoft, www.microsoft.com/ie ■

Rants and Raves

IE 5 IS THE BROWSER many love to hate. Like a pup that looks cute at the pound (or in this case, sounds good in the marketing materials) but later reveals a penchant for gnawing expensive shoes (or trashing your system), it's guaranteed to frustrate you. Here are some things about IE 5 that deserve a thwack on the nose with a rolled-up newspaper—and a few others we find irresistible.

IE 5 RANTS

■ **Image Toggling** Give us one toolbar button to turn images on and off, so we can speed downloads of slow, graphic-heavy sites. And don't point us to the Power Tools utility. Build it in.

■ **Organize Favorites** The AutoComplete integration with Favorites wins a thumbs-up from us, but the awkward interface for organizing, moving, and sorting bookmarks does not. It's far simpler to find the Favorites folder on your hard drive and make changes from there.

■ **Outlook Express 5** IE's Internet mail client, a competitor to Netscape's Messenger, still has a long way to go before it's perfect. Though the interface is simpler than the version in IE 4, it's still confusing in spots, and its wide range of powerful features can be overwhelming.

IE 5 RAVES

■ **Web Form AutoComplete** A dramatic reduction in repetitive typing compensates you generously for the slight unease of knowing that all your best secret words are stored in a local file. Remember: They're encrypted.

■ **Smaller Footprint** Apparently someone was listening after all: Now you can ditch the push channels, choose your own e-mail client, and get Java when you need it. A 6.5MB minimum size makes this a beta you can download in your lifetime.

■ **Persistence** Finally, no more navigating through endless frames just to rediscover information that you found on a previous expedition. Go straight to the treasure trove by using persistent states.

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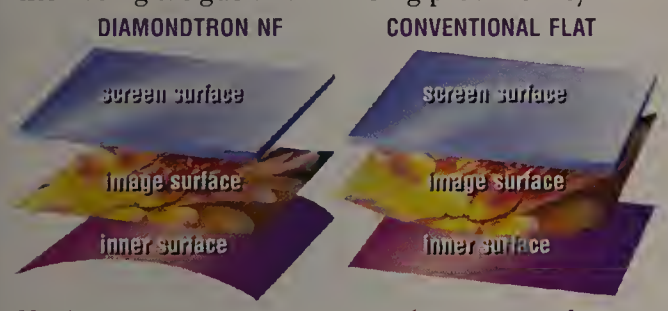

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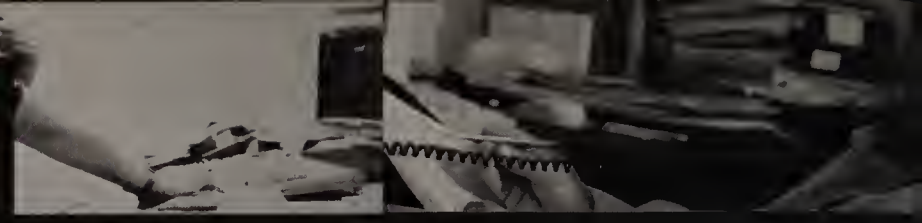

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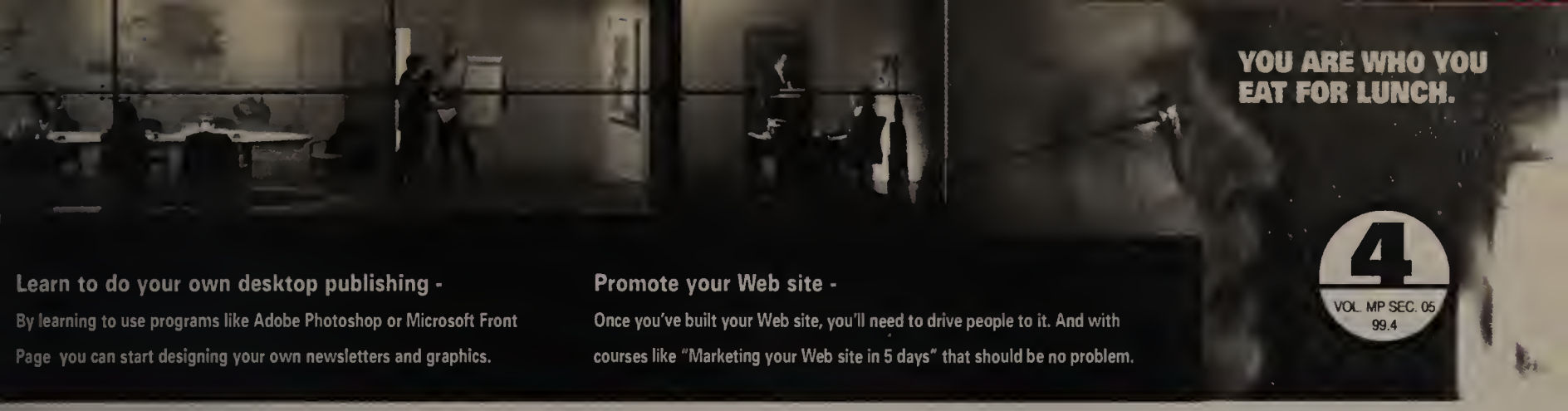

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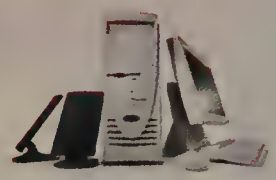

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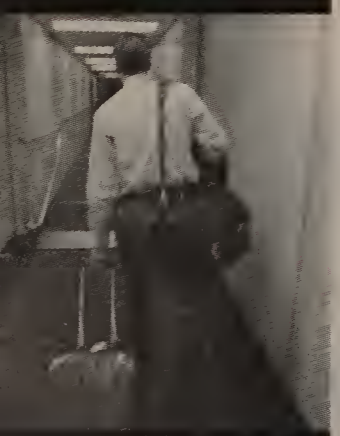

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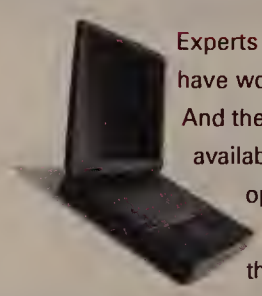

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a Micron service technician prior to the provision of on-site service. The Intel Inside Logo and Pentium are registered trademarks and Pentium II Xeon, Celeron and MMX are trademarks of Intel Corporation. Microsoft, Windows, Windows NT and the Windows logo are registered trademarks of Microsoft Corporation. Product names of Micron products are
trademarks or registered trademarks of Micron Electronics, Inc. Other product names used in this publication are for identification purposes only and may be trademarks of their respective companies. Note: advertised configurations may differ from award-winning configurations. °All hard drive sizes calculated with 1GB equal to 1 billion bytes. †The
TransPort TREK² 366MHz system was ranked #1 by *PC World*. At the time of ranking, the system was code-named "Micron Meridian". ***System Wizard Mobile Client not available with Windows NT. **For all Micron PCs configured with 56Kbps modems: Maximum transmission speed of up to 56Kbps when downloading data and 33.6Kbps when
uploading. However, actual performance is dependent upon numerous factors and observed transfer rates may be less than the maximum potential. △One year free with purchase of new Micron desktop and portable systems. *You will receive a coupon for a free upgrade to Microsoft Office 2000 when you purchase a Micron Millennia or TransPort
TREK² equipped with Microsoft Office 97. This coupon must be redeemed by Aug. 30, 1999. Micron will send a copy of Microsoft Office 2000 upon its release which is currently scheduled for October 1999. If system is returned, there will be no upgrade. °CD-ROM speeds: 40X max. 17X min. 32X max. 17X min. 24X max. 12X min.

Micron Leasing arranged by an independent entity to qualified commercial customers. Above lease payments based on 36 month, FMV terms and do not include taxes, fees or shipping charges. Leasing subject to credit approval and availability.
Above lease terms subject to change without notice or obligation.

A non-refundable up-front freight charge applies for participation in PowerXchange to cover cost of return packaging and processing.

Superior Service - Sure, we have 24/7 technical support, but why stop there. Micron goes one step further by offering Advanced Portable Exchange: A program that gives Micron laptop users the option of receiving advanced, unprecedented service offerings. In fact, we'll even ship your computer anywhere in the country to make sure you're up and running at all times. It's one more way Micron delivers more than just great systems.

The world is a book, and those who do not travel, read only a page.
—William Goins, III

"First things first: we've got to acknowledge the fastest Pentium-class notebook that we have ever tested - TransPort TREK².''

—*CNET*, January '99

366MHz
Power Special

Model Name	TREK² 300	TREK² 300	New! TREK² 333	New! TREK² 366
Processor	Intel® Celeron™ processor 300MHz	Intel Pentium II processor 300MHz	Intel Pentium II processor 333MHz	Intel Pentium II processor 366MHz
Cache	128KB L2 pipeline burst cache	256KB L2 pipeline burst cache	256KB L2 pipeline burst cache	256KB L2 pipeline burst cache
RAM	32MB EDO DRAM	64MB SDRAM	64MB SDRAM	12BMB SDRAM
Hard Drive	4GB hard drive (removable)✦	6GB hard drive (removable)✦	6GB hard drive (removable)✦	10GB hard drive (removable)✦
Monitor	12.1" SVGA TFT display	13.3" XGA TFT display	14.1" XGA TFT display	14.1" XGA TFT display
Extra Storage	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)	3.5" floppy disk drive (dedicated bay)
CD-ROM	24X CD-ROM drive° (dedicated bay)	24X CD-ROM drive° (dedicated bay)	24X CD-ROM drive° (dedicated bay)	24X CD-ROM drive° (dedicated bay)
Graphics	4MB AGP graphics accelerator	4MB AGP graphics accelerator	4MB AGP graphics accelerator	4MB AGP graphics accelerator
Sound System	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone	Built-in stereo speakers & microphone
Warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty	5-year/1-year Micron limited warranty
Software Included	Microsoft® Windows® 98 System Wizard Mobile Client™™ Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition Free* Upgrade to Microsoft Office 2000 System Wizard Mobile Client™™ Norton AntiVirus	Microsoft Windows 98 Microsoft Office Small Business Edition Free* Upgrade to Microsoft Office 2000 System Wizard Mobile Client™™ Norton AntiVirus	Microsoft Windows 98 System Wizard Mobile Client™™ Norton AntiVirus
Training:	1-year free$^{\Delta}$ training at Micron U online	1-year free$^{\Delta}$ training at Micron U online	1-year free$^{\Delta}$ training at Micron U online	1-year free$^{\Delta}$ training at Micron U online
Also Includes:	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports	Zoomed Video capable Li-Ion battery (dedicated bay) Microphone, stereo line-in/out jacks Touchpad pointing device CardBus ready S-Video & NTSC out; MPEG compatible Wavetable/3D Positional Sound 2-way fast infrared port 2 Type II/1 Type III PCMCIA slots 2-USB, parallel, serial, VGA, PS/2 ports
Factory Direct Price	$1,699 $59/mo. Business Lease 36 mos.**	$2,299 $80/mo. Business Lease 36 mos.**	$2,699 $93/mo. Business Lease 36 mos.**	$3,699 $120/mo. Business Lease 36 mos.**
Order Code:	20050	20051	20052	20053

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WINDOWS® NT® EXPERIENCE

As the first direct PC manufacturer to ship Windows NT back in '94, Micron's knowledge and experience can help you maximize your Windows NT network, now and into the future.

FREE TRAINING ON WINDOWS NT AND MORE

Through Micron University, a revolutionary online "training center", Micron customers have access to free training you simply won't find elsewhere. Learn everything from implementing a domain structure to maximizing network efficiency.

PREPARE FOR THE FUTURE NOW WITH MICROSOFT® WINDOWS® 2000-READY SYSTEMS

CRITICS RAVE

"Micron's NetFrame 3100 gives your web customers what they want before they click away."

— *PC Computing*
A-List, Best Web Server
June 30, 1998

"Micron ClientPro provides gracious plenty' for corporate IS and small-business buyers alike...This Windows NT 4.0 workhorse comes ready to network, with a preinstalled 3Com Etherlink LAN adapter card and Intel's remote control software for system monitoring."

— *PC World*
November 1998

Micron's ClientPro features Microsoft Windows NT:
- **Easy user Interface**
- **Reliable**
- **Built for Business**

NEW!

CLIENTPRO® CS 500

POWERFUL NEW INTEL® PENTIUM® III PROCESSOR 500MHz.

$2,199

- Intel Pentium III processor 500MHz
- 128MB 100MHz SDRAM
- 8.4GB Ultra ATA hard drive◆
- 17" Micron 700Vx monitor (15.9" display)
- 40X CD-ROM drive°
- 3Com 3C905 WOL 10/100 network card
- Microsoft® Windows NT® Workstation 4.0
- Micron's Client Pro is Windows-2000 ready
- 1-Year Free△ Training at Micron University

Micron And Microsoft Help You Get Ahead Of The Game Today.

As your business grows, turn to Micron to help you harness the high performance of Windows NT today - and make the smoothest migration to the Windows 2000 family of products in the future. Micron's Client Pro managed desktops and NetFRAME servers are engineered to give you the network and performance advantages your company needs to get ahead in today's competitive climate. Network-ready right out of the box, built on industry standards, and packing the power of the Intel Pentium III processor 500MHz, the ClientPro puts more manageable power in your office. And if you're looking for a reliable and expandable server, it would be tough to beat Micron's NetFRAME servers running with the powerful new Intel Pentium II Xeon™ processor. Nothing maximizes a network today and tomorrow like Windows NT technology – and no one delivers it better than Micron.

intel inside® pentium® III PROCESSOR

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Through our new AdvanceDeploy program, Micron offers exclusive access to Microsoft Windows 2000 Professional and Windows 2000 Server, ensuring a smooth transition to the next generation of Windows NT.

FLEXIBLE FINANCE OPTIONS

Micron's revolutionary MPower program is designed to meet your needs no matter how you prefer to purchase, offering qualified users no interest,[11] no payments for 60 days as well as multiple upgrade options.

4

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Only Micron Gives You Free Training On Microsoft Windows NT® And More.

In our continuing effort to build not only powerful systems, but powerful users, we are proud to introduce Micron University. Offering over one hundred free online training courses, seminars and self-paced tutorials, this powerful new tool can teach you everything you need to know about Windows NT, help you better manage your network and even provide MCSE training and certification. Instead of simply selling you powerful systems, we provide the tools you need to get the most out of that technology.

Introducing the new ClientPro CS 500 and NetFRAME 3101 with Intel's New Pentium® III processor 500MHz.

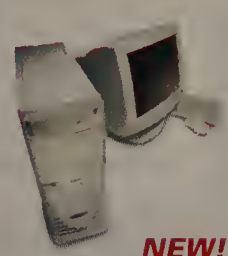
NEW!

ClientPro CP 400

Solid Performance, Exceptional Value

- Intel® Celeron™ processor 400MHz
- 128KB internal L2 cache
- 64MB 100MHz SDRAM
- 4.3GB Ultra ATA hard drive◆
- 17" Micron 700Vx (15.9" display)
- 40X max speed CD-ROM drive°
- 8MB nVidia Riva128ZX AGP graphics
- 64-voice PCI Wavetable sound
- 3Com 3C905 WOL 10/100 network card
- 5-year/3-year Micron Power‡‡‡ limited warranty
- 1-year free[6] training @ Micron U online
- Intel LANDesk® Client Manager
- Microsoft Windows NT Workstation 4.0
- Norton AntiVirus
- SMART II hard drive monitoring
- Chassis intrusion detection
- Fan, temperature, and voltage problem reporting
- Virus detection reporting
- Remote Wake Up capability
- MicroTower case
- 3.5" floppy drive
- 104-key enhanced keyboard
- Microsoft IntelliMouse[7]

$1,399 $49/mo. Business Lease. 36 mos.[5]



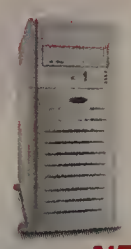
NEW!

ClientPro CS 500

The Highest Performing Managed PC[1]

- Intel Pentium III processor 500MHz
- 512KB internal L2 cache
- 128MB 100MHz SDRAM
- 8.4GB Ultra ATA hard drive◆
- 17" Micron 700Vx (15.9" display)
- 40X max speed CD-ROM drive°
- 8MB Real 3D Starfighter AGP graphics
- 64-voice PCI Wavetable sound
- 3Com 3C905 WOL 10/100 network card
- 5-year/3-year Micron Power limited warranty
- 1-year free[6] training @ Micron U online
- Intel LANDesk Client Manager
- Microsoft Windows NT Workstation 4.0
- Norton AntiVirus
- SMART II hard drive monitoring
- Chassis intrusion detection
- Fan, temperature, and voltage problem reporting
- Virus detection reporting
- Remote Wake Up capability
- MiniTower case
- 3.5" floppy drive
- 104-key enhanced keyboard
- Microsoft IntelliMouse[7]

$2,199 $77/mo. Business Lease. 36 mos.[5]



NEW!

NetFRAME 3101

The Top-Rated Web Server[8] *PC Computing* Nov. 98

- Intel Pentium III processor 500MHz
- 512KB internal L2 ECC cache
- 128MB ECC 100MHz SDRAM
- 9GB U2W LVDS SCA 1" hard drive◆
- 32X max speed CD-ROM drive°
- 5-year/3-year Micron Power limited warranty
- Dedicated server technical support, 7x24
- 1-year next-business-day on-site service†††
- Intel LANDesk Server Manager
- Emergency Management Port Console
- Supports up to two Intel Pentium III processors
- 100MHz frontside bus and up to 1GB memory support
- Integrated Ultra Wide SCSI-3 dual channel controller
- Intel PRO/100+ Server Adapter
- Integrated RAID upgrade support
- 5 expansion slots: 3 PCI, 1 ISA, 1 shared PCI/ISA
- 8 drive bays: 1 external 3.5", 2 external 5.25"
- 5 hot-swap redundant 1.0" hard drive bays

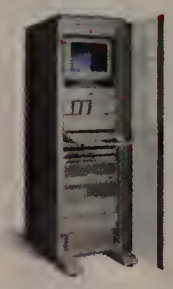
$3,299 $115/mo. Business Lease. 36 mos.[5]

NetFRAME 6200

High-Powered Server For Fast-Growing Businesses

- Intel Pentium II Xeon™ processor 450MHz
- 512KB integrated L2 ECC cache
- 128MB ECC EDO DRAM
- 9GB U2W LVDS SCA 1" hard drive◆
- 32X SCSI CD-ROM drive°
- 5-year/3-year Micron Power limited warranty
- Dedicated server technical support, 7x24
- 1-year next-business-day on-site service†††
- NOS support (3 first-year incident resolutions)
- Intel LANDesk Server Manager 6.0
- Emergency Management Port Console
- Microsoft Windows NT Server 4.0 (10-user license)
- Supports up to four Intel Pentium Xeon processors
- Options for 512KB, 1MB or 2MB L2 cache
- 4GB ECC EDO support (16 DIMM sockets)
- Integrated Ultra-2 Wide LVDS dual channel & narrow SCSI controller
- 7 expansion slots: 6 PCI, 1 shared ISA/PCI
- 6 internal, hot-swapable hard drives bays
- 1 hot-swapable 400-watt power supply (upgradeable to 3 w/redundancy)
- 3 external 5.25" media bays and floppy drive
- Free-standing pedestal chassis standard (7u rack mount option available)

$6,999 $225/mo. Business Lease. 36 mos.[5]



NetFRAME 9200

The Mission-Critical Enterprise Server

- Intel Pentium II Xeon processor 450MHz
- 512KB internal L2 ECC cache
- 256MB ECC EDO DRAM
- 2 dedicated 4GB U2W LVDS redundant hot-swapable boot drives
- 32X max speed CD-ROM drive°
- 5-year / 3-year Micron Power limited warranty
- Dedicated server technical support, 7x24
- 1-year next-business-day on-site service†††
- NOS support (3 first-year incident resolutions)
- Intel LANDesk Server Manager 6.0
- Emergency Management Port Console
- Microsoft Windows NT Server 4.0 (10-user license)
- Supports up to four Intel Pentium Xeon processors
- Options for 512KB, 1MB or 2MB L2 cache
- 8GB ECC EDO support (32 DIMM sockets)
- Intel PRO/100+ Server Adapter w/Adaptive Load Balancing and Adapter Fault Tolerance software
- Integrated Ultra-2 Wide LVDS dual channel controller
- 10 expansion slots: 4 hot-plug ready 64-bit PCI slots, five 32-bit PCI & 1 PCI/ISA slot shared
- 2 hot-swapable 750-watt 220-volt power supplies (upgradeable to 3 w/redundancy)
- 7u rack mount chassis (cabinet and accessories sold separately)

$14,199 $457/mo. Business Lease. 36 mos.[5]

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WE'RE BUILDING POWERFUL USERS.

1. At Micron, we invest in you. Buy any new Micron system and you're automatically enrolled in Micron U. You'll have access to over one hundred free^Δ online courses, seminars and tutorials for one full year on the hottest topics in computing, software and business today. Log in from any computer, 24 hours a day, 7 days a week. It's that easy.

MICRON U - HERE'S HOW IT WORKS.

2. Micron University offers two ways to learn: either with others in online, instructor-led classes, or on your own, at your own pace, with our self-study tutorials. Both offer comprehensive and flexible ways to become a more powerful PC user and better apply technology to your life.

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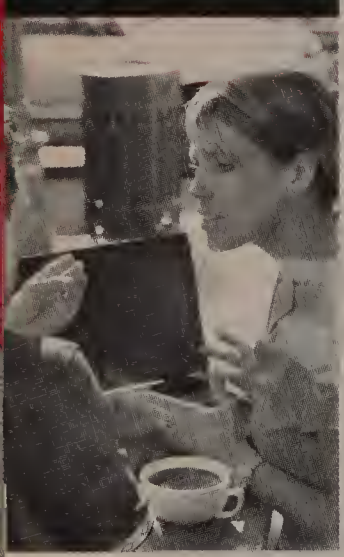
Get The Most Out Of Your Systems With Micron University.

"Micron University is a great idea. I have been able to learn things I knew were somewhere on the Web, but couldn't find. It's also available to me whenever I want."

Micron University freshman.



PC MAGAZINE'S EDITORS' CHOICE MILLENNIA® C400

$1,299

- Intel® Celeron™ processor 400MHz
- 128MB internal L2 cache
- 64MB SDRAM
- 8.4GB Ultra ATA hard drive◆
- 17" Micron 700Vx monitor (15.9" display)
- 40X° CD-ROM drive
- 8MB AGP graphics, nVidia Riva 128ZX
- Advent AV009 speakers
- 3Com USRobotics V.90 WinModem**
- Microsoft® Windows® 98
- Microsoft Office 97 Small Business Edition
- Free* Office 2000 upgrade
- 1-Year Free^Δ Training at Micron University

Order code: 50150

"If you're looking for a computing experience – not just a computer – the Micron Millennia C400 is a great choice."

PC MAGAZINE EDITORS' CHOICE JAN '99

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Perhaps Micron systems continue to win the praise of industry experts and power-users, because only Micron provides our customers with not only the latest technology, but also the powerful tools one needs to win in the demanding new economy. New tools like Micron University. A joint project between Micron Electronics, Microsoft, and Ziff-Davis (the leader in online training and publisher of *PCWeek* and *PC Magazine*), Micron University offers a complete curriculum of online classes, seminars and self-paced tutorials on the hottest topics in computing and business today. Accessible twenty-four hours a day, seven days a week, a one-year subscription to Micron University comes standard with every new Micron desktop or portable system. This revolutionary program can drastically decrease training costs while empowering users of all skill levels and disciplines. It's just one more way that Micron is building not only powerful systems, but powerful users as well.

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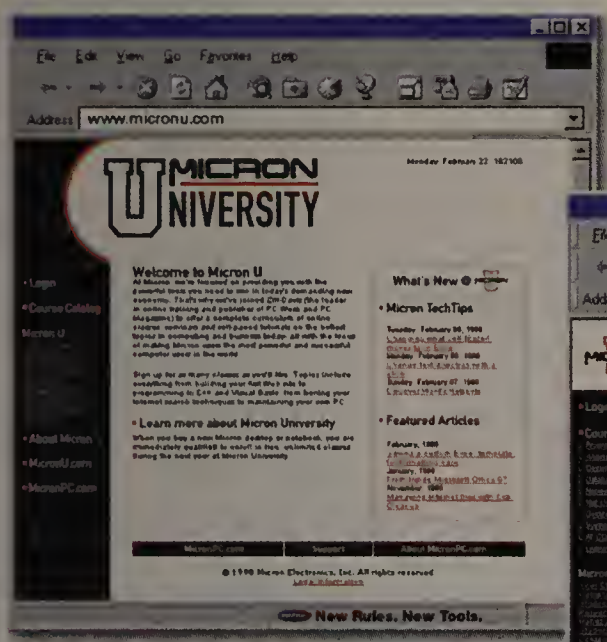
INSTRUCTOR-LED CLASSES.

3. Learning takes place in a virtual classroom, which utilizes a powerful, yet simple to use, threaded message board. Each class is led by industry experts and professional trainers so you know you're being taught by the best. You'll get personalized attention and do it all from the keyboard of your computer – no matter where you are!

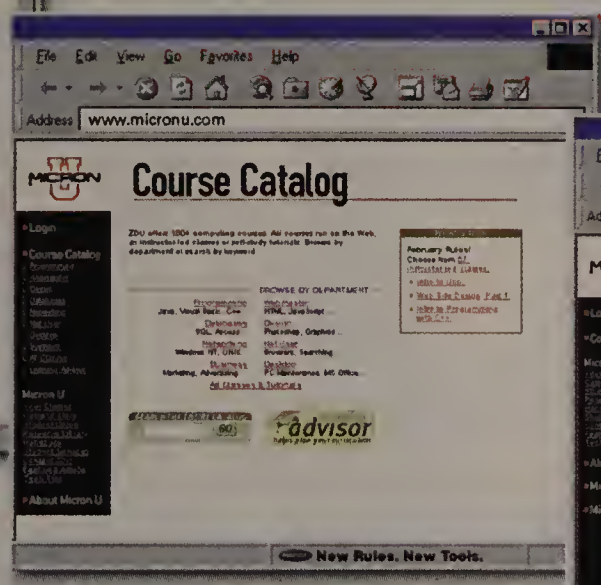
SELF-STUDY TUTORIALS.

4. Learn on your own by following comprehensive tutorials, involving a series of learning exercises. After you master the skills and concepts of each tutorial, you can move on to the next lesson or choose a new topic. You can take tutorials to become a power user on the most popular software applications on the market including Microsoft Office and Windows NT® Workstation.

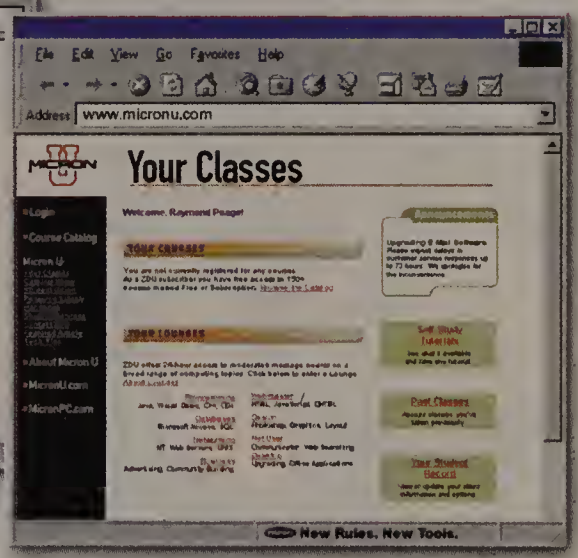
Only Micron University Makes Training This Easy



1. Log on to www.MicronU.com



2. Register for classes



3. Start Learning Online

Every Micron system, including the Millennia C400, comes with unlimited, free[Δ] access to over 150 courses. Here are just a few.

Business
- Building an Online Community
- Exploring Electronic Commerce
- Internet Advertising
- Internet Business Strategy
- Investing on the Web
- Internet Search Techniques

Desktop
- Intro to ACT! 4.0
- Troubleshooting Your Own PC
- Upgrading Your Own PC
- Maintaining Your Own PC
- Upgrading to Windows 98
- Prepare Your PC for 2000
- A+ Certification

Database
- Intro to SQL
- Intro VBA with Microsoft Access 97 (2 parts)

Design
- Intro to QuarkXPress
- Adobe PhotoShop (3 parts)
- Intro to Adobe Illustrator (2 parts)
- Web Site Design (2 parts)
- HTML Tables & Frames
- Create Web Graphics with Paint Shop Pro

Internet
- JavaScript Cookbook
- Five JavaScript Rollovers in Five Days
- Build a Web Site Customer Feedback Form
- Promote Your Web Site in Five Days
- Create Your First Web Site with HTML
- Intro to HTML 4 (3 levels)
- Intro to FrontPage 98 (2 parts)
- Intro to VRML (2 parts)
- Optimizing Web Site Performance

Networking
- Intro to Microsoft Networking
- Windows NT 4: System Administration
- Windows 95 Installation and Support (2 parts)
- Exchange Server 5: Implementation and Support (3 parts)
- Microsoft Internet Information Server 4 (3 parts)
- Windows 98: Installation and System support (3 parts)
- Windows NT 4: Enterprise Server (4 parts)
- Windows NT 4: Server (3 parts) Windows NT 4: TCP/IP (3 parts)

Programming
- Intro to Object Technology
- Intro to C Programming
- Programming with C++ (3 parts)
- Programming with Visual Basic 5 (5 parts)
- Java programming (3 parts)
- Intro to CGI Programming with Perl 5
- Java for Programmers

Self-Study Tutorials
- Access 97 (3 levels)
- Excel 7.0 (2 levels)
- Excel 97 (3 levels)
- FrontPage 98 (2 levels)
- Internet Explorer 4.0: Introduction
- Microsoft Exchange Client 5.0: Introduction
- Microsoft Project 98 (2 levels)
- Netscape Navigator 3.0
- Netscape Communicator 4.0
- Notes 4.6 (2 levels)
- Outlook 97 (2 levels)
- Outlook 98 (2 levels)
- PowerPoint 7.0: level 1
- PowerPoint 97 (2 levels)
- Quicken Deluxe 98
- Windows 95 (2 levels)
- Windows 98: Transition from Windows 95
- Windows 98: Introduction
- Windows NT Workstation 4.0
- Word 7.0 (2 levels)
- Word 97 (3 levels)
- WordPerfect 8.0 (2 levels)

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BY CHRISTINA WOOD

CPU Scams

YOUR PC MAY BE HOTTER THAN YOU THINK. STOLEN AND COUNTERFEIT CHIPS ARE ON THE RISE—AND YOU COULD ALREADY BE A VICTIM.

It's sunset on August 28, 1998, in Fremont, California. Four masked and heavily armed men approach a small, nondescript building set amid a cluster of industrial structures. Their target: the headquarters of Wintec Industries, a manufacturer and distributor of computer memory and components. Wintec is isolated from heavy traffic at this time of day, making it an attractive target for a gang of thieves. ▶

The group has planned the operation carefully, outfitting themselves with assault rifles, pistols, and schematics of the building. But their luck turns bad in a hurry. They can't get into the building, even after pistol-whipping security guard Teodoro Garcia unconscious. Meanwhile, they spot several employees fleeing the premises. The robbers panic and start shooting, hitting Hsu-Pin Tsai in the back as he tries to escape in his car. At a hospital later that night, Tsai is pronounced dead.

Sound like an episode of *NYPD Blue*? Except for turning violent, this type of high-tech robbery happens all the time. Christopher Woiwode, supervisory special agent in the FBI's San Jose high-tech detail, estimates that such crimes cost companies more than a million dollars a day in Silicon Valley alone.

And technology firms aren't the only losers. Once thieves abscond with the goods, they sell them to consumers via the gray market. Other crooks work more subtly: They buy cheap CPUs, doctor them (or the motherboards they're connected to) to run at higher-than-rated speeds (a process called overclocking), re-mark them to look like the real thing, and sell them to unsuspecting customers. These re-marked processors—often Pentium II-300 or -333 chips posing as Pentium II-400 or -450 speed burners—are so hard to tell from the real thing that you may be using one in your PC without knowing it.

IF YOU DO OWN A COUNTERFEIT OR STOLEN PROCESSOR, YOU'VE BEEN RIPPED OFF.

If you do own any of these counterfeit or stolen goods, you've been ripped off. Hot chips aren't covered under warranty, of course, and there's no guarantee they'll work as advertised. If authorities determine you've got a stolen CPU, they might confiscate it as evidence. And even if the CPU you buy is not stolen but rather expertly re-marked, you've still paid $100 to $200 more than the chip is worth. "People are being defrauded," says Steve Swartzendruber, an investigator for the Santa Clara County district attorney and a member of the React Task Force, which tracks high-tech crime in Silicon Valley for the FBI, IRS, and local law enforcement. "It would be like buying a Volkswagen thinking it was a Corvette. Maybe they both go the same speed, but there sure is a difference."

Dave Brown, an investigator for Intel, warns, "Re-marked CPUs are unpredictable—they might work, they might not." Such a processor could be dead on arrival, or only buckle under heavy use, taking your data with it.

FIGHTING THE GOOD FIGHT: FBI Special Agent Christopher Woiwode, who investigates criminals that traffic in stolen and re-marked CPUs, says high-tech theft is rampant.

GOING TO MARKET

ALL THE GOODS stolen or made by these criminals end up in the gray market, a network of dealers who traffic in bargain components—some perfectly legitimate, some stolen, counterfeit, or re-marked. Once you get away from name-brand systems like Compaq, Dell, and IBM, and big stores like CompUSA—in other words, if you shop at a swap meet, an online auction, a little-known mail-order company, or a local computer shop—your chances of encountering the gray market are good. *PC World* tried shopping in these outlets, and sure enough, we got burned (see "The Undercover Shopper," page 147).

"You can't tell [if a dealer sells illegal goods]," says Joe Chiaramonte, senior manager of corporate security at Sun Microsystems. "Gray market dealers advertise in computer magazines and newspapers. They do legit business as well as illicit. That's why they're called gray—because

they deal with the legitimate market *and* the black market."

Goods change hands so often between the time they're stolen or counterfeited and the time they're for sale that even the seller may not know the goods are hot or fake—they may have simply not asked too many questions before buying them.

Detective Don Sevesind of the Pomona, California, police department, says picking out fakes can be hard even after careful inspection: "I have to take out a magnifying glass and look for all these intricate things. Most [resellers] simply don't know if they are buying re-marked or stolen goods."

It's even more difficult for consumers to know whether they've bought stolen goods. You may first discover that your product is stolen when you call the company for technical support or warranty repair and are asked for a serial number. Most vendors keep track of PC serial numbers; some track components as well. If a company discovers your product is hot, police may promptly turn up to confiscate it. As Sevesind, who has had to seize stolen goods from unknowing consumers, plainly explains, "It's illegal to knowingly possess stolen or counterfeit goods." If your CPU is confiscated, your only recourse is to demand your money back from the company that sold it to you—an unlikely proposition at best.

FORGERIES AND FAKES

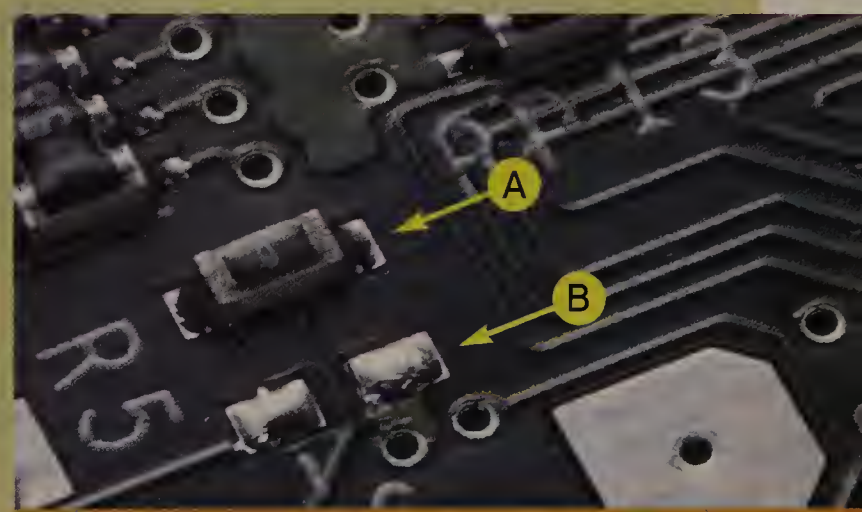
OFTEN, THE ONLY indication that you may have a stolen CPU is a price that seems too good to be true—but even that's not always the case. In early 1998, Lee Gerbitz of Yuma, Arizona, bought a Pentium MMX-233 CPU from Auctionboard on the Internet for $230—a good price at the time, but not so good that he suspected foul play. After Gerbitz installed the processor, he couldn't get ▶

The Undercover Shopper

How easy is it to buy re-marked CPUs on the open market? *PC World* went undercover to find out. We threw caution to the wind and shopped only by price—ignoring important factors like company reputation and restocking fee policies. We avoided big-time system builders who have direct relationships with Intel, AMD, or Cyrix, and went to an Internet auction, an online dealer, a swap meet, a local clone shop, and a lesser-known mail-order PC maker. We bought two complete systems and two loose CPUs. While at the clone shop, we even picked up a suspicious-looking Microsoft mouse.

After taking our booty to investigators, we discovered we had one bogus CPU on our hands. Both of the Pentium II-400 systems, purchased from the mail-order vendor and the local computer shop, contained an authentic chip. Experts at Intel gave the CPU we bought from the online dealer a clean bill of health, and Microsoft investigators said that the mouse, which was packaged only in a plastic bag and not accompanied by a certificate of authenticity, was also legitimate. Then again, it was an "OEM" model, intended to be sold only as part of a complete system. We're still not sure about the PC we ordered from the Net auction site: Almost two months after we ordered it, it hasn't arrived.

But the CPU we bought at a swap meet was indeed overclocked and re-marked, though the case showed no signs of tampering. When Intel investigators popped it into a computer to check it out, the system wouldn't boot at all. They took the CPU out of its external case and found that two of its resistors had been altered to make the chip run at 400 MHz. When they popped the chip back into the computer, it worked, thus exhibiting the classic symptom of a re-marked processor: intermittent problems. After running a test used by law enforcement to identify re-marks, the investigators found that the Pentium II-400 we had paid $325 for was actually manufactured as a Pentium II-333, a much cheaper chip. At this writing, a Pentium II-333 could be had on the Internet for only $181. Our re-markers probably made a handsome profit by duping us. If you shop based on price alone, you may be setting yourself up too.



NOT BUILT FOR SPEED: Jumpers on the Pentium II (A) tell the CPU how fast to run. Re-markers removed a jumper (B), forcing this processor to run faster than it was intended to.

You Don't Always Get What You Pay For

VENDOR	We bought...	We paid...	We got...	Comments
Internet auction site	bare-bones Pentium II-400 system	$499	nothing yet	One of the dangers of online auctions is that you may never get your goods. Nearly two months after ordering the PC, we're still waiting.
Local PC shop	Pentium II-400 system	$1299	Pentium II-400 system	We didn't get burned, but you should ask local shops where they buy their CPUs, since they often buy from re-markers.
Mail-order firm	Pentium II-400 system	$1215	Pentium II-400 system	Though the price was $200 lower than the competition's, this system was legit.
Small Internet dealer	Pentium II-400 CPU	$328	Pentium II-400 CPU	Our CPU was fine, but dealing with smaller, lesser-known Net dealers is chancy.
Swap meet peddler	Pentium II-400 CPU	$325	re-marked PII-333 CPU overclocked to run as a PII-400	It would be difficult to return this CPU, as we'd have to find the seller again.

his PC to boot up correctly. After trying everything he could think of, including replacing the motherboard, he called Intel for help. A technician told him he really had a Pentium MMX-166 CPU disguised as a PMMX-233, and then walked him through resetting the motherboard so the CPU would run at its original 166-MHz speed. After that, Gerbitz had no problems with it—no problems, that is, except he'd paid about $100 more than a PMMX-166 was worth. According to Gerbitz, Auctionboard admitted it had gotten a bad batch of CPUs and promised to replace his, but it never did. The company didn't respond to numerous calls and e-mails from *PC World*. "I feel cheated and ripped off and I'll never buy anything from an auction site again," says Gerbitz. "I'm afraid to."

Criminals may have earned $100 on Gerbitz's CPU alone. Re-markers can produce a chip that's nearly impossible for users to identify as forgery. Typically, a re-marker overclocks a legitimate CPU, lasers off the serial number, and stencils in markings that identify it as a faster model.

Neither AMD nor Intel (we were unable to reach Cyrix for comment) would say what percentage of the CPUs on the market are re-marked—any figure would be guesswork. Chuck Mulloy, an Intel spokesperson, ventured that "the percent is in the low single digits." MicroDesign Resources, a technology research firm, estimates that Intel shipped 87 million processors in 1998, so even 2 percent would mean that over 1.7 million chips were later re-marked. Once you shop outside of superstores and large direct vendors, your chances of getting a re-marked CPU skyrocket. The FBI's Woiwode adds that "the [re-marking] problem is rampant and industrywide." His worries go beyond consumer fraud. "We are also concerned with one of these bad chips getting into the lunar module or something like that."

A motley crew of counterfeiters take a lower-tech approach, trying to pass off high-tech garbage as expensive computer

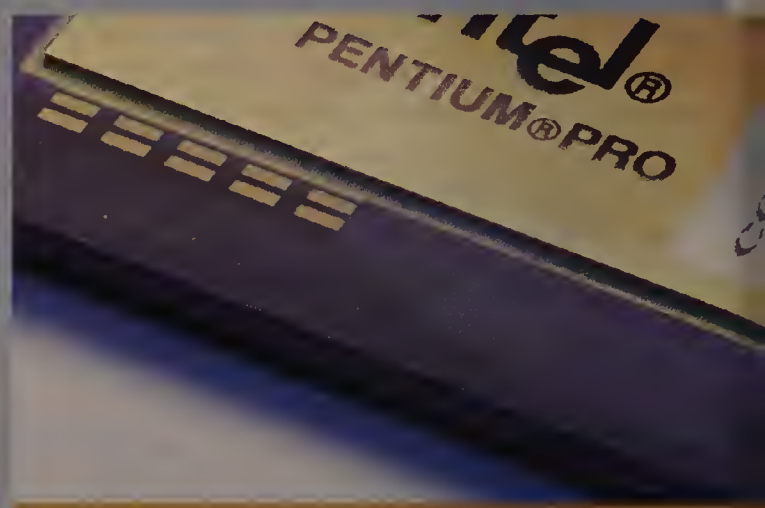
ID, Please

So you're patting yourself on the back for getting such a good deal on that new PC. But just because the BIOS announces that you have a 400-MHz Pentium II, that doesn't mean you actually do.

Unfortunately, there's no easy way to ascertain whether your Pentium II was built to run at a slower speed. If you're experiencing lots of unexplainable system crashes—especially after the system has started up successfully—that's an indicator. But getting a definitive answer requires a careful examination of the CPU. And sometimes only Intel has the expertise to know for sure.

There are, however, several tests you can perform yourself. Intel's Pentium II Identification Web page at support.intel.com/support/processors/pentiumII/identify.htm is a good place to start. For a different perspective from a non-Intel resource, check out Inside Intel! (www.pro-desk.com/inside/special/remarking/chare_faqs.htm), which provides detailed procedures for checking Pentium IIs (the CPUs most likely to be tampered with), and also has information on identifying re-marked and overclocked AMD, IBM, and Cyrix CPUs. One caveat: Following some of the advice this site offers, such as removing the CPU housing, will invalidate your warranty.

Also, you can often learn plenty from the markings on the outside of the CPU's case. Just open your PC and examine the CPU's plastic cartridge. At one end of the top edge (or on the side if you have a Pentium Pro) you'll notice two rows of laser-etched numbers and letters (see photos). Using a magnifying glass, study the writing for any signs of erasure or alteration. Keep in mind that some re-markers, rather than altering the existing case, simply print their own. But Intel ships only cases with carefully checked, high-quality lettering, so a printing flaw in any character, or a noticeable inconsistency across several characters, is a strong indication that the chip has been re-marked. If the case markings include "ENG SAMPLE" or "CONFIDENTIAL" you probably have a stolen Pentium II that was never intended to be a production unit.



A BAD FORGERY: You can plainly see where the laser-etched numbers on this Pentium Pro CPU were sandblasted off.

If the markings look good, try Intel's downloadable utility CPUID, which lets you compare the characteristics of the CPU in your system with those indicated by the markings on the case. Find CPUID at developer.intel.com/vtune/cpuid/index.htm.

When you run CPUID, it displays the CPU's family number, model number, and stepping number as well as the amount of secondary cache. Find the five-character "sSpec" number located at the end of the top line of characters on the CPU cartridge's top edge (see photo at left). Go to Intel's CPU Quick Reference Guide at *developer.intel.com/design/pentiumII/qit*, and select the sSpec number found on your CPU's case. You'll see a data sheet for the processor that *should* be in your PC. If any of the numbers found by CPUID are different from those in the data sheet, you probably have a re-marked CPU.

Keep in mind that CPUID can't identify every re-marked CPU. If you're still suspicious, call Intel at 800/321-4044. —Kirk Steers

A CONVINCING FAKE: The two rows of numbers on this Pentium II were lasered off, then reapplied. Look for the dark area around the numbers.

components. Santa Clara's Swartzendruber calls these counterfeiters "dumpster divers." They take what is essentially trash, clean it up, and sell it to recyclers, swap meet vendors, or salvage companies. Rich Bernes, executive director of the Technology Theft Prevention Foundation, explains, "A company often throws away CPUs by selling them to a recycler. The recycler *should* destroy the components to extract reusable precious metals, but he often resells them instead. Then someone re-marks them and sells them to consumers." This type of counterfeiting isn't limited to CPUs—all kinds of computer components get sold this way (see "Counterfeit Peripherals," page 150).

THIEVES EVERYWHERE

IT'S TOUGH TO SAY how likely you are to encounter stolen or counterfeit products. Underworld activity is difficult to measure because criminals don't issue annual reports and their very survival depends on your ignorance of their scams. Even so, high-tech theft is certainly a big industry. In 1994 and 1995 an average of one to two high-tech armed robberies and burglaries a week occurred in Silicon Valley alone. Law enforcement officials responded by staging a huge sting operation called Westchips that put almost 150 people in jail.

As a result, most high-tech thefts are now either inside jobs or perpetrated on freight trucks transporting goods from manufacturers to distribution channels. "Cargo theft is off the charts," says Bernes. "It's the easiest place to hit. You have a rolling warehouse with no fences and no one armed. Instead of ships full of gold doubloons, you have trailers full of high-tech product that's easy to sell."

KEEPING AN EYE ON THEFT: Rich Bernes of the Technology Theft Prevention Foundation says cargo theft is a growing problem. He works with law enforcement to stop high-tech crime.

Gail Toth, executive director of the Transportation Loss Prevention and Security Council, agrees. "High-tech goods are a targeted commodity by cargo thieves," she says. "The FBI estimates $6 billion is lost annually to all kinds of cargo theft. And computer goods are the third or fourth most frequently stolen items. But the dollar value lost to computer freight theft is absolutely number one." One possible new means of cutting down on such theft might be the unique Processor Serial Number assigned to each new Pentium III processor. For the latest information on Intel's security plans, see this month's *Top of the News*, page 56.

WILL THE PROBLEM BE SOLVED?

LAW ENFORCEMENT naturally takes armed robbery and theft very seriously. But agencies are also beginning to ▶

Protect Yourself

Shopping for computer goods may have its perilous side, but if you know what you're doing, you can come out ahead. Just heed these warnings.

- **Be a detective.** If you're shopping at swap meets or small clone shops, examine a few of the CPUs in stock for evidence of remarking and to make sure the serial numbers are all different. Ask the staff where they get their CPUs. And know the going price of a CPU—start at www.intel.com or www.amd.com—before you shop. If the price is way below market value, be careful.
- **Check your source.** If you're buying a clone and can't look at the CPU, ask if the seller is an authorized Intel or AMD reseller. If it isn't, ask where it gets its CPUs and if *that* source is an authorized reseller. If you get double-talk, admissions that the shop buys whatever is cheapest, or any suspicious answer, the seller could be buying on the gray market.
- **Return if necessary.** Never buy a CPU or system you can't return, and if you have reason to be suspicious, examine your CPU carefully before the return period is over. If you have doubts, return it.
- **Run the numbers.** Before you purchase a computer, try running its serial number through the database at the Stolen Computer Registry (www.nacomex.com). Unfortunately, similar databases don't exist for components such as processors.

look more closely at the problem of re-marked CPUs, especially in areas like Silicon Valley and Southern California where high tech is such a big industry. It's easy to see the criminal appeal. "When we hold up a bag of cocaine and a bag of [re-marked CPUs]," says the FBI's Woiwode, "people are shocked to learn the CPUs are worth more than the cocaine. But if you're flying down the Nebraska highway and the state police pull you over and find cocaine in the trunk, you're going to jail. If they find re-marked CPUs, you can explain that away pretty easily."

Intel wants to make such possession harder to explain away. In 1998 it more than tripled the number of law enforcement officers it trains to identify re-marked CPUs. It's a question of protecting the brand name. "If you look at this from an Intel standpoint," says Intel spokesperson Manny Vara, "even if only ten CPUs that are re-marked are sold worldwide and end users buy them, that's too many."

Intel takes re-marking into consideration when engineering its CPUs. "With every product generation, we put in features to stay one step ahead of the re-markers," says Vara. For example, the Pentium II reportedly has a feature that makes overclocking difficult. But Vara admits that the engineering efforts do little more than delay the latest generation of re-marked CPUs. "These are very sophisticated criminals," he explains. "They are engineers and they know processor design. [They] set up factories and pump these things out in the hundreds."

Intel's goal is to build enough obstacles into CPUs that it's hard for re-markers to turn a profit. Few people know, however, what those deterrents are or even how the company identifies re-marks—if re-markers knew what Intel looks for, they'd quickly find a work-around.

Re-markers have a small window of opportunity. To earn their $100 or $200 per chip, they must hit at a time when the slowest chip in a CPU family sells for much less than the fastest. If they can't ▶

HOT MOUSE: This counterfeit Microsoft mouse looks just like the real thing—it's almost impossible to tell the difference.

Counterfeit Peripherals

You're on your semiannual trip to Al's Office Barn, stocking up on goodies for work. You eye a new hard drive, pick up some printer cartridges, and oh, there's a good price on a Microsoft mouse—you need one of those. It never crosses your mind that these products could be fakes.

Re-marked CPUs aren't the only illicit computer products out there. Crafty criminals manufacture counterfeit computer parts like boards, hard drives, mice, and printer supplies—usually whatever is expensive or sells in high volume. In November 1998, the FBI busted a company in Southern California for assembling SCSI boards and selling them under the Adaptec brand name. The same month in Chicago, the Department of Justice convicted an outfit for repackaging and selling off-brand computer memory as IBM product.

WHICH ONE IS FAKE? Look closely and you'll see that the cardboard on the right is flimsier, and the print is different.

Some counterfeits aren't even close to their originals, but they still fool consumers. "We were meeting with some hard drive [manufacturers] not too long ago," remembers J. Sung Maeng, an FBI special agent. "They showed us some old eight-tracks that had been marked as brand-name hard drives." People bought them, took them home, and realized they didn't even fit in the computer.

According to Greta Climer, a paralegal in international law and corporate affairs for Microsoft, "We have a widespread problem with counterfeit mice." They turn up for sale on the Internet, at swap meets, and in mom-and-pop shops. These shoddy mice fail quickly and may have a "muddy" feel when you are using them. But they look just like the real thing.

If you're shopping for a Microsoft mouse, look for a Microsoft certificate of authenticity. And Climer suggests, "If you aren't getting your mouse bundled with a computer, you should get the full retail box." If you think you have a counterfeit mouse, call the Microsoft antipiracy hotline at 800/785-3448.

And while you're inspecting the goods in your shopping cart, take a look at that printer cartridge. Bill Duffy, president and CEO of the Imaging Supplies Coalition, says, "We have uncovered hundreds of thousands of ink jet and laser cartridges, as well as ribbons, resulting in the removal of possibly millions of dollars of illegal product from commerce."

Usually the counterfeits are cartridges that have been refilled and put in look-alike retail packaging. And there's no telling what the cartridges may have been filled with. The stuff could just be poor-quality, or it could actually damage your printer. "In some cases," says Duffy, "we have seen product with heavy metals in it. Heavy metals were common in the printing industry 20 years ago but have since been banned. They're known carcinogens."

There is no straightforward way to tell a counterfeit cartridge from the real thing while you are shopping, says Duffy. "The packaging is an exact copy." But you may suspect that something is awry when your print quality isn't as good as you expected or you don't get as many copies from a cartridge as you should. Duffy advises, "Buy from a distributor you know, and if you do get bad product, return it for a refund. Don't just throw it away." For more information, check out the Imaging Supplies Coalition's Web site at www.isc-inc.org.

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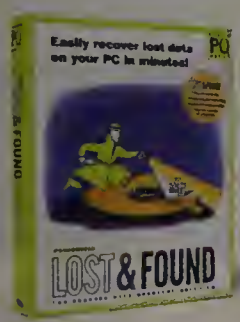

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overclock the slower chips before a new generation appears, reduced prices on the older chips will leave no room for profit.

HAVE YOU BEEN DUPED?

INTEL'S POLICIES result in a frustrating situation for consumers, who can't easily tell a re-marked processor from a legitimate one. Even savvy shoppers can find themselves paying good money for bad chips.

Allen Brock, a real estate developer in Glendale, California, is a self-proclaimed computer junkie who constantly upgrades his business computers. He likes to shop at Price Watch (www.pricewatch.com) on the Internet, even though he's been burned twice by vendors he found through the site. The first time, in early 1998, he bought what he thought was a Pentium II-300. After happening upon an online article describing re-marked CPUs, he started to wonder about his recent purchase.

"I took the chip out and, with a magnifying glass, I really examined it. You could see the original markings," he says. What Brock had was a PII-233. Luckily, he was able to get a replacement from the vendor.

Even armed with knowledge of the re-marking problem, Brock again went shopping online for a CPU upgrade for another system. Thinking he was protected by the "clock locking" technology in the new generation of Pentium IIs, Brock ordered a PII-400 from Micro Source. "When I first got it, the [CPU's] case didn't fit properly, and I thought it didn't look right," says Brock. His research pointed him to Intel's CPUID utility (see "ID, Please," page 148) and another tool from a German computer magazine, both of which indicated that his chip might be overclocked. He e-mailed Intel for confirmation, but no one there could tell him for sure.

EVEN SAVVY SHOPPERS CAN FIND THEMSELVES PAYING GOOD MONEY FOR BAD CHIPS.

After finding evidence of tampering inside the CPU's case, Brock realized he had another re-marked CPU. Fortunately, he was able to return it and get a refund. Micro Source President Eugene Braverman says, "We did have one or two instances where consumers ended up with CPUs we were suspicious about. Now we only buy from Intel-authorized dealers."

Though Brock survived his CPU ordeals, he's still unhappy with Intel. "It's hard to believe that Intel can't come up with a way for us to easily identify re-marked CPUs," he complains. "Right now it's sort of alchemy."

TWICE BITTEN: Allen Brock has learned his lesson. He bought two CPUs from online vendors, both of which were re-marked. Luckily, he got his money back—most aren't so fortunate.

WHAT CAN YOU DO?

INTEL HOPES to address this frustration with its new Pentium III family of CPUs. The company is believed to be working on a software tool that will help consumers determine if their CPUs have been re-marked. Until then, spotting stolen, counterfeit, and re-marked goods remains a crapshoot. Even a market-value price does not guarantee that the goods are legitimate—nor does a low price necessarily mean something's wrong.

So if you're hunting for bargains, be cautious. Start by reading "Protect Yourself," page 149, and following the advice there. And remember, you are the ultimate victim of these scams. Before you get too excited about a seemingly great deal, take a hard look at just how much money you'll be saving. Is it really worth the possibility of handing your computer over to a police officer or—worse—trusting your business to a CPU that's been doctored in someone's garage?

Christina Wood and Kirk Steers are contributing editors for PC World. ■

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- 512KB Integrated L2 Cache
- 12.9GB Ultra ATA Hard Drive
- 19" (18.0" viewable, .26dp) Trinitron P990 Monitor
- 16MB STB nVidia TNT 3D AGP Graphics
- 40X Max≈ Variable CD-ROM Drive
- Turtle Beach Montego A3D Sound
- ACS-295 Speakers with Subwoofer
- Iomega 100MB ZIP BUILT-IN Drive
- MS Office 97 SBE plus Bookshelf (Ask about Our *FREE* MS Office 2000 Upgrade Offer); McAfee VirusScan
- MS Windows 98/IntelliMouse
- 3-Year Limited Warranty†
- 1-Year NBD On-site^Δ Service
- ★ *6-Pak of Iomega 100MB Zip Disks, add $79.*

$2499

Business Lease◊: $84/Mo., 36 Mos.

E•VALUE CODE: 03613-590324a

NEW DELL DIMENSION XPS T450 PENTIUM III PROCESSOR AT 450MHz

- 128MB 100MHz SDRAM
- 512KB Integrated L2 Cache
- 12.9GB Ultra ATA Hard Drive
- 17" (16.0" viewable, .26dp) Trinitron 1000HS Monitor
- 8MB ATI XPERT 98D AGP Graphics
- 40X Max≈ Variable CD-ROM Drive
- Yamaha XG 64V Wavetable Sound
- harman/kardon HK-195 Speakers
- 3Com USR V.90π PCI WinModem
- Iomega 100MB ZIP BUILT-IN Drive
- MS Office 97 SBE plus Bookshelf (Ask about Our *FREE* MS Office 2000 Upgrade Offer); McAfee VirusScan
- MS Windows 98/IntelliMouse
- APC SurgeStation Pro8T2
- 3-Year Limited Warranty†
- 1-Year NBD On-site^Δ Service

$2179

Business Lease◊: $73/Mo., 36 Mos.

E•VALUE CODE: 03613-590321

NEW DELL DIMENSION XPS T450 PENTIUM III PROCESSOR AT 450MHz

- 96MB 100MHz SDRAM
- 512KB Integrated L2 Cache
- 12.9GB Ultra ATA Hard Drive
- *NEW* 17" (16.0" viewable, .26dp) M780 Monitor
- 8MB ATI XPERT 98D AGP Graphics
- 40X Max≈ Variable CD-ROM Drive
- Yamaha XG 64V Wavetable Sound
- harman/kardon HK-195 Speakers
- 3Com USR V.90π PCI WinModem
- Trial Offer ConnectDirect Internet Access√
- MS Office 97 SBE plus Bookshelf (Ask about Our *FREE* MS Office 2000 Upgrade Offer); McAfee VirusScan
- MS Windows 98/IntelliMouse
- 3-Year Limited Warranty†
- 1-Year NBD On-site^ Service

$1899

Business Lease◊: $64/Mo., 36 Mos.

E•VALUE CODE: 03613-590318

DELL DIMENSION V400 PENTIUM II PROCESSOR AT 400MHz

- 64MB 100MHz SDRAM
- 512KB Integrated L2 Cache
- 8.4GB Ultra ATA Hard Drive
- *NEW* 17" (16.0" viewable, .26dp) M780 Monitor
- 8MB ATI 3D AGP Graphics
- 40X Max≈ Variable CD-ROM Drive
- Yamaha XG 64V Wavetable Sound
- harman/kardon HK-195 Speakers
- Iomega 100MB ZIP BUILT-IN Drive
- MS Office 97 SBE plus Bookshelf (Ask about Our *FREE* MS Office 2000 Upgrade Offer); McAfee VirusScan
- MS Windows 98
- Dell QuietKey Keyboard
- Logitech First Mouse+ Wheel (PS/2v)
- 3-Year Limited Warranty†
- 1-Year NBD On-site^Δ Service
- ★ *Upgrade to a NEW 12.9GB Ultra ATA Hard Drive, add $69.*

$1579

Business Lease◊: $53/Mo., 36 Mos.

E•VALUE CODE: 03613-590315

DELL DIMENSION V333c INTEL® CELERON™ PROCESSOR AT 333MHz

Network-Designed Desktop

- 32MB SDRAM
- 128KB Integrated L2 Cache
- 8.4GB Ultra ATA Hard Drive
- 15" (13.8" viewable) 800F Monitor
- 8MB ATI 3D AGP Graphics
- 32X Max^ Variable CD-ROM Drive
- Integrated Intel 10/100 Ethernet
- MS Office 97 SBE plus Bookshelf (Ask about Our *FREE* MS Office 2000 Upgrade Offer); McAfee VirusScan
- MS Windows 98
- Dell QuietKey Keyboard
- Logitech First Mouse+ Wheel (PS/2v)
- Intel LANDesk® Client Manager v3.3
- 3-Year Limited Warranty†
- 1-Year NBD On-site^Δ Service
- ★ *Upgrade to a NEW 17" (16.0" viewable, .26dp) M780 Monitor, add $59.*

$1199

Business Lease◊: $40/Mo., 36 Mos.

E•VALUE CODE: 03613-590311

POWER UPGRADES

- Iomega 100MB ZIP BUILT-IN Drive with Two Disks, add $99.
- 3Com USRobotics V.90π PCI Telephony WinModem, add $49.
- 3Com 3C905B 10/100 NIC, add $50.
- Intuit QuickBooks v6.0 Pre-installed, add $118.
- 3-Year Next-Business-Day On-site^Δ Service, add $99.

Prices valid with system purchase only.

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  $149
  $199 – $50 MAIL-IN REBATE

DELL DIMENSION AWARD INFO

- In 1998, Dell Dimension desktops won more than 90 product and service awards. See www.dell.com/awards98 for details.
- Winner of the 1998 PC Computing MVP "State-of-the-Art Desktop" (XPS R450) and "High-Performance PC" (XPS R400) awards.

Advertised configurations vary from award-winning configurations.

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- Microsoft® Windows® 98/Touchpad
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★ *Upgrade to a 6.4GB Ultra ATA Hard Drive, add $149.*

★ *56K Capable™ Gold Card Global Modem, add $139.*

$3299

Business Lease◊: $110/Mo., 36 Mos.

E•VALUE CODE: 03614-890332

NEW DELL INSPIRON 7000 A366GT
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- Removable Combo 24X Max^^ Variable CD-ROM and Floppy Drive
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- 3D Surround Sound and HW Wavetable
- 12-Cell Intelligent Lithium Ion Battery
- Custom Leather Case
- Internal 56K Capable™ V.90 Fax Modem
- Trial Offer ConnectDirect℠ Internet Access√
- MS Office 97 SBE (Ask about Our *FREE* MS Office 2000 Upgrade Offer)
- Microsoft Windows 98/Touchpad
- 3-Year Limited Warranty†

$2999

Business Lease◊: $100/Mo., 36 Mos.

E•VALUE CODE: 03614-890329

NEW DELL INSPIRON 7000 A333GT
PENTIUM II PROCESSOR AT 333MHz

All-in-One Multimedia Performance
- 14.1" XGA Active Matrix Display
- 32MB SDRAM (384MB Max⊖)
- 4GB Ultra ATA Hard Drive
- Removable Combo 24X Max^^ Variable CD-ROM and Floppy Drive
- 2X AGP 4MB ATI RAGE Pro 3D Video
- 3D Surround Sound and HW Wavetable
- 12-Cell Intelligent Lithium Ion Battery
- Second Intelligent Lithium Ion Battery
- Internal 56K Capable™ V.90 Fax Modem
- Trial Offer ConnectDirect Internet Access√
- MS Office 97 SBE (Ask about Our *FREE* MS Office 2000 Upgrade Offer)
- Microsoft Windows 98/Touchpad
- 3-Year Limited Warranty†

$2699

Business Lease◊: $90/Mo., 36 Mos.

E•VALUE CODE: 03614-890326a

NEW DELL INSPIRON 7000 A300GT
PENTIUM II PROCESSOR AT 300PE MHz

Light Weight, Light Price
- 14.1" XGA Active Matrix Display
- 32MB SDRAM (256MB Max)
- 3.2GB Ultra ATA Hard Drive
- Modular 24X Max^^ Variable CD-ROM
- NeoMagic® MediaMagic™ 256AV AGP Video
- 3D Surround Sound and SW Wavetable
- 9-Cell Intelligent Lithium Ion Battery
- APC Notebook Surge Protector
- Internal 56K Capable™ V.90 Fax Modem
- Trial Offer ConnectDirect Internet Access√
- MS Office 97 SBE (Ask about Our *FREE* MS Office 2000 Upgrade Offer)
- Microsoft Windows 98/Touchpad
- 3-Year Limited Warranty†

$2299

Business Lease◊: $77/Mo., 36 Mos.

E•VALUE CODE: 03614-890322

DELL INSPIRON 3500 A266XT
PENTIUM II PROCESSOR AT 266PE MHz

Light Weight, Light Price
- 13.3" XGA Active Matrix Display
- 32MB SDRAM (256MB Max)
- 3.2GB Ultra ATA Hard Drive
- Modular 24X Max^^ Variable CD-ROM
- Modular Floppy Drive
- NeoMagic MediaMagic 256AV AGP Video
- 3D Surround Sound and SW Wavetable
- 9-Cell Intelligent Lithium Ion Battery
- MS Office 97 SBE (Ask about Our *FREE* MS Office 2000 Upgrade Offer)
- Microsoft Windows 98/Touchpad
- 3-Year Limited Warranty†

★ *Upgrade to 64MB SDRAM, add $99.*

$1999

Business Lease◊: $67/Mo., 36 Mos.

E•VALUE CODE: 03614-890319

NEW DELL LATITUDE® CPi A366XT
PENTIUM II PROCESSOR AT 366MHz

Network-Optimized Notebook
- 13.3" XGA Active Matrix Display
- 64MB SDRAM (256MB Max)
- 4.3GB Ultra ATA Hard Drive
- Modular 24X Max^^ Variable CD-ROM
- Modular Floppy Drive
- NeoMagic MediaMagic 256AV AGP Video
- 3D Surround Sound and SW Wavetable
- Intelligent Lithium Ion Battery with 1-Hour ExpressCharge™ Technology
- Custom Leather Case
- MS Windows NT® Workstation 4.0
- Touchpad
- 3-Year Limited Warranty†
- 1-Year NBD On-site△ Service

$3199

Business Lease◊: $87/Mo., 36 Mos.

E•VALUE CODE: 03614-790331

DELL LATITUDE CPi D233ST
PENTIUM II PROCESSOR AT 233MHz

Network-Optimized Notebook
- 12.1" SVGA Active Matrix Display
- 64MB EDO RAM (256MB Max)
- 4.3GB Ultra ATA Hard Drive
- Modular 24X Max^^ Variable CD-ROM
- Modular Floppy Drive
- NeoMagic 128-bit Graphics Accelerator
- 3D Surround Sound and SW Wavetable
- Intelligent Lithium Ion Battery with 1-Hour ExpressCharge Technology
- MS Windows NT Workstation 4.0
- Touchpad
- 3-Year Limited Warranty†
- 1-Year NBD On-site△ Service

★ *MS Windows 98 Available, subtract $85.*

$2399

Business Lease◊: $80/Mo., 36 Mos.

E•VALUE CODE: 03614-890323

DELL NOTEBOOK AWARD INFO

- Inspiron 7000 A366LT – *PC Magazine's* Editors' Choice for small businesses, 1/99.

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PENTIUM® II XEON™ PROCESSOR AT 450MHz
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- 256MB ECC EDO RAM
- Three 9GB 10,000 rpm Ultra-2/LVD SCSI Hot-Swap Hard Drives
- Ultra-2/LVD PowerEdge Expandable RAID Controller 2 with 128MB ECC Cache (Quad-Channel)
- HP® OpenView™ NNM Special Edition
- Integrated Dual Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- Redundant Hot-Swap Power Supplies, Cooling Fans and Processor Fans
- 7 Expansion Slots: (4) 64-bit, (3) 32-bit PCI
- 8-1" Hard Drive Bays
- 4-5.25" Media Bays
- 3-Year NBD On-site[Δ] Service
- 1-Year DirectLine℠ NOS Support
- 7x24 Dedicated Server Hardware Technical Telephone Support

$12,899

Business Lease[◊]: $425/Mo., 36 Mos.

E•VALUE CODE: 03615-290301

DELL POWEREDGE 4300 SERVER
PENTIUM II PROCESSOR AT 400MHz
(DUAL PROCESSOR/RAID CAPABLE)

- 128MB 100MHz ECC SDRAM
- 9GB Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)
- HP OpenView NNM Special Edition
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- Redundant Hot-Swap Power Supplies, Cooling Fans and Processor Fans
- 12/24GB Variable SCSI DAT Tape Backup Unit
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- 6-1.6" Hard Drive Bays
- 4-5.25" Media Bays
- 3-Year NBD On-site[Δ] Service
- 1-Year DirectLine NOS Support
- 7x24 Dedicated Server Hardware Telephone Technical Support

$5999

Business Lease[◊]: $201/Mo., 36 Mos.

E•VALUE CODE: 003615-290359

DELL POWEREDGE 2300 SERVER
***NEW* PENTIUM III PROCESSOR AT 500MHz**
(RAID 5 CONFIGURATION)

- 128MB 100MHz ECC SDRAM
- Three 9GB Ultra-2/LVD SCSI Hot-Swap Hard Drives
- Ultra-2/LVD PowerEdge Expandable RAID Controller 2 (Single-Channel)
- HP OpenView NNM Special Edition
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- 6-1" Hard Drive Bays
- 4 Media Bays: 3-5.25", 1-3.5"
- 3-Year NBD On-site[Δ] Service
- 7x24 Dedicated Server Hardware Telephone Technical Support

★ *Upgrade to 256MB 100MHz ECC SDRAM, add $389.*

★ *APC Smart-UPS 700W Power Supply, add $369.*

$5549

Business Lease[◊]: $186/Mo., 36 Mos.

E•VALUE CODE: 03615-290355

DELL POWEREDGE 2300 SERVER
***NEW* PENTIUM III PROCESSOR AT 450MHz**
(DUAL PROCESSOR/RAID CAPABLE)

- 64MB 100MHz ECC SDRAM
- 9GB Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)
- Microsoft® Windows NT® Server 4.0 (10 Client Access Licenses)
- HP OpenView NNM Special Edition
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- 4-1.6" or 6-1" Hard Drive Bays
- 4 Media Bays: 3-5.25", 1-3.5"
- 3-Year NBD On-site[Δ] Service
- 7x24 Dedicated Server Hardware Technical Telephone Support

★ *12/24GB Variable SCSI DAT Tape Backup Unit, add $749.*

$3949

Business Lease[◊]: $132/Mo., 36 Mos.

E•VALUE CODE: 03615-290339

DELL POWEREDGE 2300 SERVER
PENTIUM II PROCESSOR AT 350MHz
(DUAL PROCESSOR/RAID CAPABLE)

- 64MB 100MHz ECC SDRAM
- 4GB Ultra-2/LVD SCSI Hard Drive (Hot-Swap Optional)
- HP OpenView NNM Special Edition
- Integrated Ultra-2/LVD and Ultra/Narrow SCSI Controllers
- 6 Expansion Slots: 4 PCI, 2 PCI/ISA
- 4-1.6" or 6-1" Hard Drive Bays
- 4 Media Bays: 3-5.25", 1-3.5"
- 3-Year NBD On-site[Δ] Service
- 7x24 Dedicated Server Hardware Technical Telephone Support

★ *Upgrade to a Pentium II Processor at 400MHz, add $300.*

★ *MS Windows NT Server 4.0 (10 Client Access Licenses), add $799.*

$2349

Business Lease[◊]: $79/Mo., 36 Mos.

E•VALUE CODE: 03615-290323

NEW DELL POWEREDGE 1300 SERVER
PENTIUM II PROCESSOR AT 350MHz
(DUAL PROCESSOR/RAID CAPABLE)

- 64MB 100MHz ECC SDRAM
- 4GB Ultra-2/LVD SCSI Hard Drive
- HP OpenView NNM Special Edition
- Integrated PCI Ultra-2/LVD SCSI Controller
- 6 Expansion Slots: 5 PCI, 1 PCI/ISA
- 4 Hard Drive Bays: 2-1.6" and 2-1"
- 3-5.25" Media Bays
- 3-Year NBD On-site[Δ] Service
- 7x24 Dedicated Server Hardware Technical Telephone Support

★ *Upgrade to 128MHz ECC SDRAM, add $189.*

★ *Second Pentium II Processor at 350MHz, add $399.*

★ *Upgrade to a 9GB Ultra-2/LVD SCSI Hard Drive, add $200.*

$1849

Business Lease[◊]: $62/Mo., 36 Mos.

E•VALUE CODE: 03615-290318

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Must purchase a PowerEdge server to be eligible for installation services

DELL SERVER AWARD INFO

- *Network World* "World Class Award" – Dell PowerEdge 2300, 6/98.
- *Computer Shopper* "Top 100" – Dell PowerEdge 2300, 11/98.
- *PC Computing*'s "The 'A' List" – Dell PowerEdge 6300, 11/98.
- *LANTIMES* "The Best of *LANTIMES* Over $25,000"– Dell PowerEdge 6300, 9/98.
- *ComputerWorld*'s "Leaders' Choice" Winner Workgroup Servers – Dell PowerEdge Family, 1/98.

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pentium® II xeon™ PROCESSOR

DELL PRECISION™ WORKSTATION 610
PENTIUM® II XEON™ PROCESSOR AT 450MHz
(Dual Processor/ RAID Capable)

- 256MB 100MHz ECC SDRAM
- 512KB Full-Speed Integrated L2 Cache
- 9GB Ultra-2/LVD SCSI Hard Drive
- Adaptec RAIDPort Ultra-2/LVD Adapter
- 21" (19.8" viewable) Trinitron® 1600HS Monitor
- 3D*labs* Oxygen GMX 2000 Graphics Card
- 40X Max≈ Variable CD-ROM Drive
- Sound Blaster Pro Compatible Sound
- Integrated 3Com® 10/100 PCI NIC
- Remote Client Manageability Support via DMI 2.0; Wakeup on LAN Capable
- MS® Windows NT® 4.0 and 1-Year NT Telephone Support
- 3-Year NBD On-site^Δ Service
- 7x24 Dedicated Hardware Tech Support

$6449

Business Lease◊: $216/Mo., 36 Mos.

E•VALUE CODE: 03616-490364

NEW DELL PRECISION WORKSTATION 410
PENTIUM III PROCESSOR AT 500MHz
(Dual Processor/ RAID Capable)

- 128MB 100MHz ECC SDRAM
- 512KB Integrated L2 Cache
- 4GB Ultra-2/LVD SCSI Hard Drive
- *NEW* 17" (15.9" viewable) M780 Monitor
- Diamond 8MB AGP Graphics Card
- 40X Max≈ Variable CD-ROM Drive
- Sound Blaster Pro Compatible Sound
- Integrated 3Com 10/100 PCI NIC
- Remote Client Manageability Support via DMI 2.0; Wakeup on LAN Capable
- MS Windows NT 4.0 and 1-Year NT Telephone Support
- 3-Year NBD On-site^Δ Service
- 7x24 Dedicated Hardware Tech Support

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Business Lease◊: $112/Mo., 36 Mos.

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- MS® IntelliMouse®
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- 1-Year NBD On-site^Δ Service

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E•VALUE CODE: 05550-590321b

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CUSTOM CONFIGURE YOUR SYSTEM

1 component selection may require changes to other system options. Pl

Dell Dimension XPS R MiniTower
Pentium®II processor, 450MHz with 512KB L2 Cache

Memory
128MB 100MHz SDRAM

Hard Drive HELP ME CHOOSE
12.9GB Ultra ATA Hard Drive

Monitor HELP ME CHOOSE
NEW 17" (16.0" viewable, .26dp) M780 Monitor

Video Card HELP ME CHOOSE
NEW 16MB STB nVidia TNT 3D AGP Graphics Card

Please review the following regarding your Video selection:
• Not available on the 4.8X DVD with Software Decoding

DVD-ROM or CD-ROM Drive HELP ME CHOOSE
40X Max Variable CD-ROM Drive

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RIGHT: Agfa's $699 DuoScan T1200 wins our corporate scanner Best Buy, thanks to its bundled transparency adapter and reliable OCR scanning. LEFT: With good overall performance and one-button scanning, the $299 Epson Perfection 636 earns our small- and home-office Best Buy. BOTTOM: Plustek's $149 OpticPro 9636T gets our Best Buy for home use; it includes a fine support package and is the only sub-$200 model with a transparency adapter.

By Deke McClelland

PHOTOGRAPHS BY BEVERLY HARPER

a scanner for all reasons

From $99 bargains to corporate workhorses, there's a scanner out there with your name on it.

IF YOU'VE BEEN LONGING FOR THE DAY when desktop scanners would cost as little as $99 and be as easy to use as a microwave oven, then stop yearning and start buying. In some cases, scanners are easier to install and repair than average kitchen appliances. With Universal Serial Bus (USB) interface on many of the models, you can plug into a running PC and watch Windows 98 load drivers automatically. Some scanners even include buttons that launch applications and run previews in seconds.

All 19 scanners we reviewed scan color photos, optimize gray-scale images for black-and-white printing, and convert text pages into editable word processing documents. Some even weigh less than a half gallon of milk.

In evaluating these devices, the PC World Test Center tested each scanner's speed and image quality performance. I conducted similar tests informally in my workaday office and, more importantly, reviewed each unit's ease of use, features and software, and vendor service and support.

The result: a Top 10 list of scanners and, among those, three Best Buys, each intended for a specific use. If you're on the prowl for a personal scanner, chances are you want one that's easy to use and easy on your pocketbook, yet produces good-looking scans for e-mailing to friends and sending to your color printer. The $149 Plustek OpticPro 9636T not only meets those criteria but also ▶

provides lots of extras. Hewlett-Packard's $199 ScanJet 4100C is also terrific for home users. (At press time, HP introduced a new, higher resolution model, the $199 ScanJet 4200C with an optical resolution of 600 dots per inch.)

For a small or home office, spend a little more for a scanner that's fast and a champ at optical character recognition (OCR). The $299 Epson Perfection 636 fits that description to a tee—so well that if we had to select just one Best Buy, this unit would be it.

Corporate users need a flexible workhorse that produces high-quality scans from reflective media such as pages and prints, and from transparent media like slides and film negatives. Top-notch OCR capabilities are also a must. Just four scanners in our roundup fit that bill, and the best of them is Agfa's $699 DuoScan T1200, a rugged tank that outperforms even my old, $1500 Agfa Arcus scanner.

TRENDS AND TECHNOLOGY

WHEN PC WORLD last looked at scanners, we reviewed three sheetfed and eight flatbed scanners. This time around, all 19 scanners we looked at are flatbeds—you lift the lid, lay the page on the glass, and scan. What happened to the sheetfeds? According to Kristy Holch of InfoTrends Research Group, virtually none of the vendors manufacture them anymore because demand has declined dramatically. "People feel they get more out of a flatbed scanner because they can scan any kind of document. In the early nineties, there was a big price advantage to sheetfeds, but now that has disappeared." For folks who still prefer to feed pages, companies such as Agfa and Umax offer optional document feeder attachments for their more expensive scanners.

As sheetfeds disappear, another technology emerges, if just barely. Scanners using *contact image sensor* (CIS) technology rely on simpler optics and fewer parts for a slimmer design. The CIS device we looked at—Canon's $99 CanoScan FB 620P, which missed our Top 10—weighs a dainty 4.4 pounds and stands a bit taller than a keyboard. But if the CanoScan is any indication of the technology's potential, CIS has its work cut out for it. Despite satisfactory image quality, the CanoScan was the slowest unit we tested. The other 18 models in our review come with *charge-coupled device* (CCD) sensors, which have a more complicated circuitry system, resulting in a larger footprint compared with CIS-based scanners.

The other change in scanner technology is the arrival of USB. Seven of the 19 devices we tested support USB, whereas

CCD versus CIS

SCANNERS use one of two types of sensors to capture images. Most units use charge-coupled device sensors. CCD-based models such as Pacific Image's ScanAce 1236P have a bulky design to accommodate power-intensive circuitry and an intricate system of lamps, mirrors, and lenses. A contact image sensor (CIS) uses a single chip that handles many data-processing functions. CIS-based scanners like the CanoScan FB 620P rely on simpler optics and more power-efficient LEDs, resulting in slimmer, lighter units.

CCD **PRO:** In most cases, captures better image quality than CIS-based scans.
CON: Larger and heavier than most CIS units.
BOTTOM LINE: Reliable scan quality.

CIS **PRO:** Inexpensive and light, slim design.
CON: Inferior scan quality to CCD scans.
BOTTOM LINE: Scan quality needs improvement.

TOP 10 SCANNERS FEATURES COMPARISON

	SCANNER	Overall score [1]	Street price (2/1/99)	Scorecard: Scan quality	Scan speed	Ease of use	Support policies/ quality	Features	Basic features: Connection type	Maximum optical/ enhanced resolution (dpi) [2]
1	Epson Perfection 636* 800/463-7766 www.epson.com	92	$299	good	very good	excellent	good/ very good	very good	SCSI	600 x 1200/ 9600 x 9600
2	Umax Astra 2400S 800/562-0311 www.umax.com	90	$399	good	excellent	satisfactory	very good/ poor	good	SCSI	600 x 2400/ 9600 x 9600
3	HP ScanJet 6200C 800/722-6538 www.scanjet.com	87	$399	excellent	very good	good	satisfactory/ good	good	SCSI [6], USB	600 x 1200/ 9600 x 9600
4	Microtek ScanMaker X6 800/654-4160 www.microtekusa.com	87	$149	good	good	satisfactory	satisfactory/ good	good	USB	600 x 1200/ 9600 x 9600
5	Plustek OpticPro 9636T† 800/685-8088 www.plustekusa.com	87	$149	good	satisfactory	good	good/ good	very good	parallel	600 x 1200/ 9600 x 9600
6	Pacific Image ScanAce 1236P 310/618-8100 www.scanace.com	85	$99	very good	satisfactory	poor	good/ satisfactory	satisfactory	parallel	600 x 1200/ 9600 x 9600
7	Acer AcerScan Prisa 620U 800/369-6736 www.acerperipherals.com	85	$129	satisfactory	very good	satisfactory	excellent/ satisfactory	satisfactory	USB	600 x 1200/ 9600 x 9600
8	HP ScanJet 4100C [7] 800/722-6538 www.scanjet.com	83	$199	good	satisfactory	very good	satisfactory/ good	good	USB	300 x 600/ 9600 x 9600
9	Agfa DuoScan T1200‡ 888/281-2302 www.agfahome.com	82	$699	good	good	satisfactory	good/ poor	excellent	SCSI [6]	600 x 1200/ 9600 x 9600
10	Visioneer 6100B 800/787-7007 www.visioneer.com	82	$129	good	poor	good	good/ satisfactory	good	parallel	600 x 1200/ 9600 x 9600

Best Buy ● Yes ○ No

* Small- and home-office Best Buy.
† Home Best Buy.
‡ Corporate Best Buy.

[1] Based on scanned image quality (28 percent), scanning speed (25 percent), ease of use (17 percent), features (15 percent), support (10 percent), and price (5 percent).

[2] All Top 10 scanners support a maximum color depth of 36 bits.

none did a year ago. In theory, USB's bandwidth hovers between those of the sluggish parallel port and a superfast SCSI connection. Our tests suggest that USB can transfer the data as fast as the scanner is able to capture it. And whereas SCSI requires you to add cards, set addresses, and terminate the last device, USB is plug and play.

These technological developments, though important, have little to do with why scanners are flying off retailers' shelves. There has never been a more opportune time to buy a scanner, quite simply because they have never been ▶

				Support policies			
Width x depth x height (inches)	Maximum scanning area (inches)	Integrated transparency adapter	Document management/image editing/ OCR software [3]	Parts/labor warranty (years)	Toll-free tech support	Weekday/ weekend support (hours)	Product info number [4]
11.3 x 16.8 x 3.5	8.5 x 11.7	●	NewSoft Presto PageManager/Adobe PhotoDeluxe Business Edition/Xerox TextBridge Classic	1/1	○	12/9 [5]	–
13.2 x 23.3 x 5.9	8.5 x 14	○	NewSoft Presto PageManager/Adobe PhotoDeluxe Business Edition, Adobe Photoshop LE/Caere OmniPage Limited Edition	1/1	●	15/9 [5]	723
12.3 x 19.6 x 4.7	8.5 x 11.7	○	Caere PageKeeper Standard/Adobe PhotoDeluxe Business Edition/Caere OmniPage Limited Edition	1/1	○	16/7 [5]	724
11.5 x 17.3 x 3.2	8.5 x 11.7	○	Caere PageKeeper Standard/Adobe PhotoDeluxe, Ulead PhotoImpact/Caere OmniPage Limited Edition	90 days/ 30 days	○	10/none	725
11.7 x 16.7 x 3	8.5 x 11.7	●	none/Adobe PhotoDeluxe, Micrografx Picture Publisher/ Xerox TextBridge Classic	1/1	●	10.5/9	726
20.5 x 18 x 6	8.5 x 11.7	○	NewSoft Presto PageManager/NewSoft Presto ImageFolio and PhotoAlbum/NewSoft Presto Wordlinx	1/1	●	9/none	727
12 x 18 x 3	8.5 x 11.7	○	MetaCreations Kai's Photo Soap/Ulead iPhoto Express/ Xerox TextBridge Classic	1/1	●	24/24	728
11.2 x 18.3 x 3.3	8.5 x 11.7	○	Caere PageKeeper Lite/Adobe PhotoDeluxe/Caere OmniPage Limited Edition	30 days/ 30 days	○	16/7 [5]	729
15.5 x 22.5 x 6.3	8.5 x 14	●	Visioneer PaperPort/Corel Photo-Paint 8/Caere OmniPage Limited Edition	1/1	●	16/none	730
12 x 16 x 3	8.5 x 11.7	○	Visioneer PaperPort/PictureWorks PhotoEnhancer/ Visioneer OCR	1/1	●	11/none	731

For additional components of the software bundle, visit www.pcworld.com/apr99/scanners.

[4] For more information about all products in this table, select product info no. 909 or visit www.pcworld.com/productinfo.

[5] Saturday only.

[6] No bundled adapter board.

[7] Replaced, at press time, by the new $199 HP 4200C with 600-dpi optical resolution.

scan results

HATS OFF TO AGFA: It not only wins points for best color scan, but also gets our Best Buy vote for business users. Its $699 DuoScan captured splendid detail and vivid color, closely resembling the original. The less expensive Best Buy SOHO scanner from Epson also received high marks, producing rich, warm colors. But compared with the DuoScan, the Perfection 636 did not deliver as great detail on the hat. Our Best Buy pick for home users, Plustek's OpticPro 9636T, displayed fine color, but overall the image appeared dark. "It looked like it was going to rain," one judge noted disapprovingly. The AcerScan Prisa 620U captured an even darker image, and it tended to cast a reddish tinge on objects, making the hand appear sunburned. To view scan results, visit www.pcworld.com/apr99/scanners. —Grace Aquino

ORIGINAL

Agfa DuoScan T1200
BEST IMAGE

Acer AcerScan Prisa 620U
WORST IMAGE

Plustek OpticPro 9636T
HOME BEST BUY

Epson Perfection 636
SOHO BEST BUY

Agfa DuoScan T1200
CORPORATE BEST BUY

so inexpensive—so low, in fact, that the average price of a flatbed scanner has plummeted by more than $300 over the last two years.

Ease of Use

BEST: Epson Perfection 636

WORST: Pacific Image ScanAce 1236P

EPSON'S SCSI-BASED Perfection 636 earns high marks for ease of use, easy connectivity, one-button scanning, intuitive software, and overall efficiency.

SCSI scanners usually perform fastest but are arguably the most difficult to install. Most PCs don't include SCSI ports, so you have to open up your machine and install a PCI or ISA card, included with most SCSI scanners. Of the seven SCSI models we looked at, the Agfa DuoScan T1200 and HP ScanJet 6200C lack a SCSI board (the HP unit also has a USB connector). Fortunately, our SCSI scanners connected smoothly. I daisy-chained three scanners to a single port and ran jobs from them simultaneously. If a scanner lacks a SCSI chain terminator, it may not work properly. (You can buy a chain terminator for under $5.)

If you have only a parallel connection or won't be upgrading, Visioneer's $149 6100B gets points for button-driven scanning. Though a parallel connection ensures compatibility across the board, setup can be laborious. Parallel devices also scan slower than most USB scanners. Even on my new 450-MHz PC, the printer port was set by default to the sluggish bidirectional setting. If a scanner fails to work in that setting, as Pacific Image's ScanAce 1236P did, you must reconfigure the port to the faster ECP or EPP setting in your PC's BIOS. More exasperating, the parallel port accommodates one operation at a time. If you use two parallel devices at once, as when scanning to a daisy-chained printer, all devices on the bus are tied up until the operation completes. If your computer is relatively new (most new PCs come with USB), or if you're willing to install a $30 USB card, USB makes much more sense.

Among the USB models we looked at, only one—the $130 Memorex MaxxScan 6122, which missed our Top 10—failed to provide Windows 98 with a driver when asked. The MaxxScan does offer both USB and parallel ports, which makes the missing driver an acceptable tradeoff for wider compatibility.

Scan Quality

BEST: Agfa DuoScan T1200

WORST: Acer AcerScan Prisa 620U

TO MEASURE QUALITY, *PC World* jurors examined four images from each scanner—two color photographs, one gray-scale image, and one black-and-white line-art piece—and evaluated them on a five-point scale. Only two of the 19 devices tested—Agfa's DuoScan T1200 and HP's ScanJet 6200C—garnered the top rating in any single test, and neither scored high across the board. Worst in the Top 10 was the AcerScan Prisa. Five models received very low marks for all their scans. These disappointing units (none made our chart) are the Agfa SnapScan 1212U (washed-out colors), Artec AM12S (dark with red flesh tones), IBM IdeaScan (extremely dark), Memorex MaxxScan 6122 (equally dark), and Visioneer PaperPort OneTouch 5300 (problems include distorted pixels when scanning 600-dpi artwork and the omission of large portions of black-and-white line art). We corrected some flaws by adjusting brightness and contrast.

PHOTOGRAPHS: TONY STONE IMAGES/PETER CADE

Scan Speed

BEST: Hewlett-Packard ScanJet 6200C
WORST: Visioneer 6100B

MOST SCANNERS here deliver pallid performance overall, but a few do much better than their price tags would suggest.

The PC World Test Center uncovered one surprise: The fastest overall scanner we reviewed is neither USB nor SCSI, but a parallel device that didn't make our chart. Visioneer's $99 PaperPort OneTouch 5300 sailed through its scans, never ranking lower than fifth in any of the five speed tests performed. The real secret behind its speed, however, is no secret at all—it merely scans fewer pixels. With a 300-dpi maximum optical resolution, the OneTouch 5300 captured only a quarter as many pixels as 17 of the 19 devices tested. (The other 300-dpi scanner is HP's ScanJet 4100C.) Set aside the OneTouch 5300's impressive speed, and our chart rankings make more sense. Among all scanners we reviewed, the speediest SCSI devices include the Umax Astra 2400S, HP ScanJet 6200C, and Epson Perfection 636, clocking the second-, fourth-, and fifth-fastest times overall. The swiftest USB model is the non-chart-making $129 Agfa SnapScan 1212U, coming in third.

Although the Test Center timed every possible type of scan, I ran some additional tests in low-res preview mode because in my experience, it can take three or four previews to get an image lined up perfectly. In my testing, Epson's Perfection 636 smoked all the others, previewing an entire page in less than a second. The next fastest scanner took seven times that long.

The slowest scanner in every test but one was Canon's $99 parallel-based CanoScan FB 620P, which missed the Top 10. In *PC World*'s tests, the CanoScan took 8 minutes and 30 seconds to capture a 5-by-7-inch color photo at 600 dpi, 2.5 times longer than its next slowest competitor, Plustek's OpticPro 9636T. And because Canon's software calibrates the device before every scan, running a preview can take a minute or more.

Features and Bundled Software

BEST: Agfa DuoScan T1200
WORST: Acer AcerScan Prisa 620U

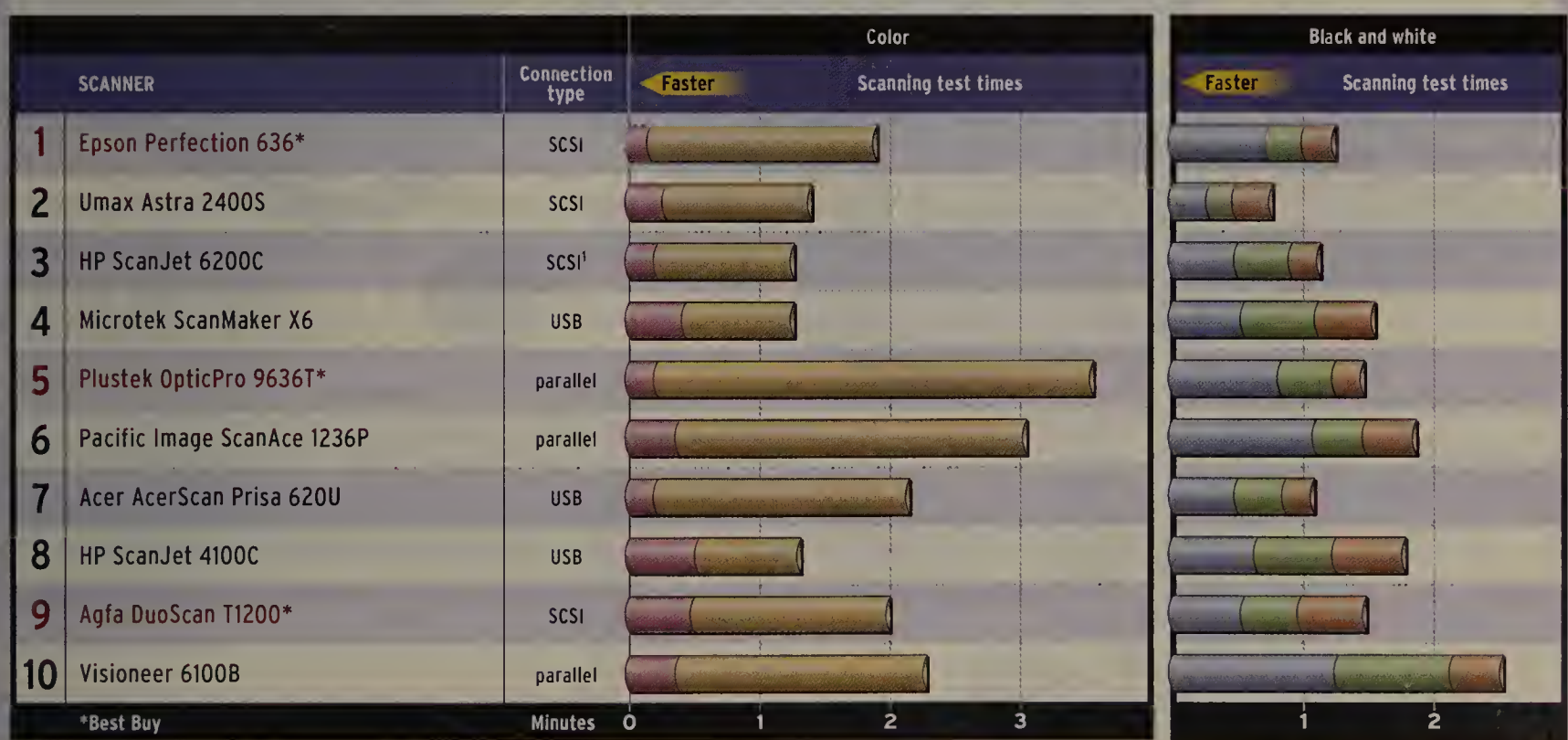
IF YOU'RE LOOKING for specific features—one-button scanning, OCR, image editing and document-management software, or a transparency adapter—there's a scanner here that'll suit your needs.

Four scanners on our Top 10—Epson Perfection 636, HP ScanJet 4100C, Microtek ScanMaker X6, and Visioneer 6100B—provide one or more buttons that automatically launch your favorite application or TWAIN-compliant scanning interface. (All scanners we saw ship with TWAIN-compliant software. So long as your favorite image editing or pub- ▶

TEST REPORT

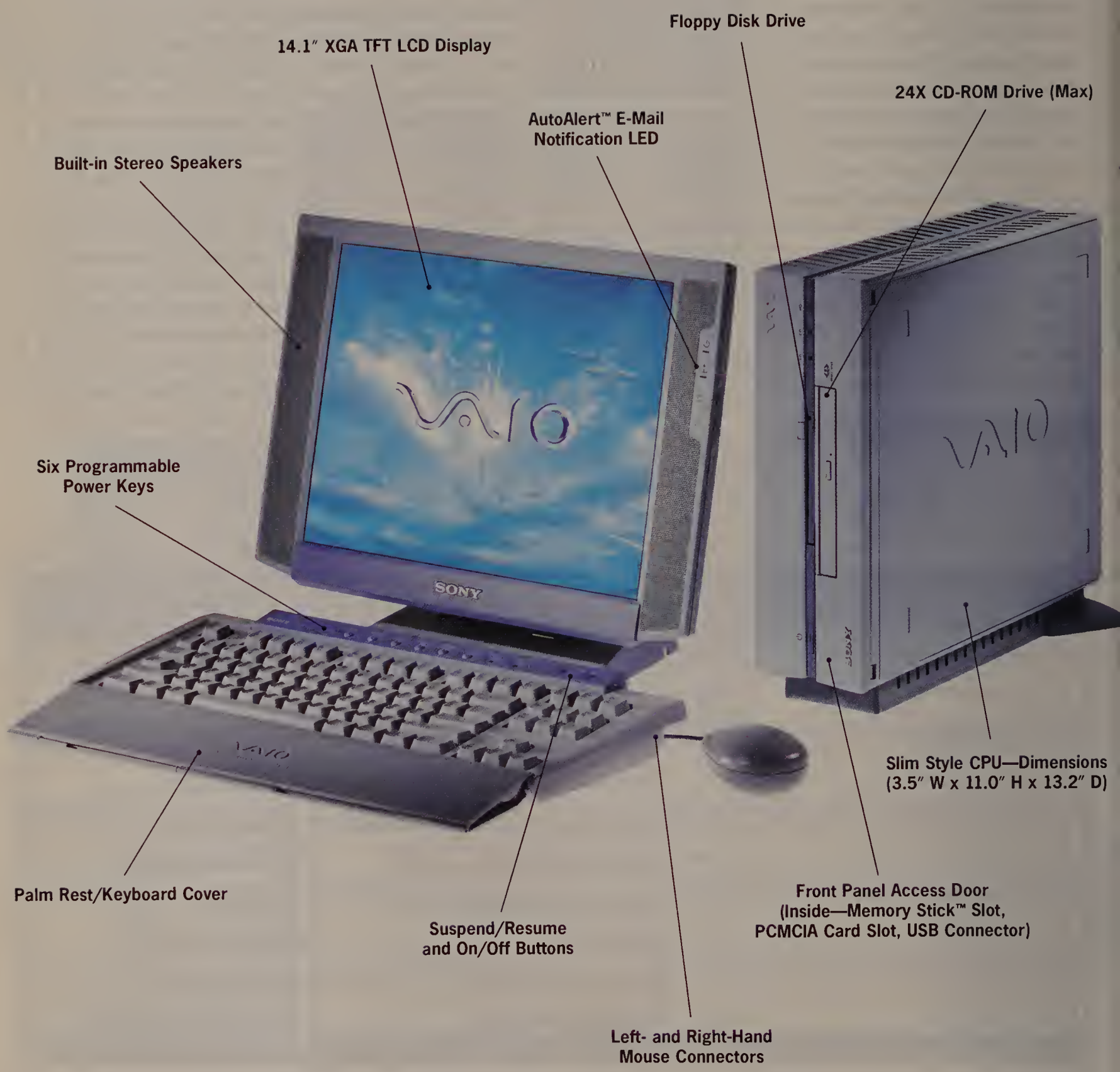
ScanJet 6200C Scans Fastest Overall

Umax Astra 2400S takes the lead in black-and-white scanning.



5-by-6-inch photo at 75 dpi
5-by-6-inch photo at 600 dpi
5-by-6-inch gray-scale photo at 600 dpi
Line art at 300 dpi
Newspaper text at 300 dpi

TEST PC WORLD CENTER **HOW WE TEST** All scanners are tested with default settings under Windows 98 on a Dell Dimension V333 (Pentium II-333) PC with 64MB of RAM, using each scanner's bundled software. Overall score is based on scanned image quality (28 percent), scanning speed (25 percent), ease of use (17 percent), features (15 percent), support (10 percent), and price (5 percent). Speed tests are timed from the start of scanning until cursor control is regained. Data based on tests designed and conducted by the PC World Test Center. All rights reserved. [1]Also includes USB interface, but scores are for SCSI interface, which performs better.


14.1″ XGA TFT LCD Display
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SONY

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The VAIO Slimtop LCD Computer. It could only be from Sony.

The VAIO Slimtop LCD Computer

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the numbers game

Identical Specs Don't Deliver Same Results

LET'S SAY YOU'VE narrowed your choices down to two scanners. Both seem to boast similar numerical specifications, such as 24, 30, or 36 bits of color depth and 300 or 600 dots per inch of optical resolution. Unfortunately, those numbers don't tell the whole story about scanner quality.

Factors such as scanner parts and software interpolation come into play. Image noise, stray light, and surface reflection may also affect the overall quality of an image.

Greater color depth and resolution theoretically produce richer and more accurate images, but if a scanner's sensor captures data poorly, even the best converter won't produce a good reproduction. A shoddy lens in a high-res scanner may also produce fuzzy images, inferior to those captured by a low-res scanner that has a sharp lens. Nothing on a scanner box can tell you how well the unit's particular lens will work.

Optical resolution, though important, can be potentially misleading. It's usually represented as two figures (for example, 300 by 600 dots per inch) but the first figure is more significant: It refers to the number of scanning elements per inch on the sensor, where each element generates a dot or pixel of information, along the horizontal axis. The second number represents the distance (or steps) the scanner carriage moves down between exposures, so 600 dpi means it produces new sampling data every 1/600 inch. But adjacent readings can look at overlapping areas, so they may not be adding much data. When evaluating scanners, double-check which figure represents optical res, because some vendors reverse the figures, putting the carriage-stepping rate first.

Most scanners also include a maximum *software-interpolated resolution* that's achieved by inserting additional dot information between, and derived from the average of, two scanned adjacent dots.

Still, devices with higher specs can produce better scans than machines whose numbers are less impressive. To know which scanner is best, you need to compare their scan results as we've done here. In general, be skeptical of ultracheap models with flashy specs. They may not deliver the quality their packaging suggests. —Yardena Arar

These models have the same specs, but scan quality differs: Umax has high contrast; HP looks washed out.

lishing app supports TWAIN—as virtually all do—you need only identify the scanner to be used, then scan a page or picture into the app.) This may sound like a gimmick, but I found it helpful—it's easier to press a button than search through menus.

Other models that offer button-driven features, but didn't make our chart, include IBM's $129 IdeaScan, which sports an array of six buttons that preview images and relay a scan to a printer or fax-modem, and Visioneer's $99 PaperPort OneTouch 5300 with five customizable buttons that provide control over the color and resolution settings, among other things.

After I tooled around with buttons, I checked out the scanners' interfaces; some were obvious, others too obscure. Microtek is the worst offender, festooning its scanner's TWAIN module with densely packed options, indecipherable icons, and tiny, unlabeled arrowheads. Epson, at the other extreme, automatically previews the image in the scanner as you open the software and supplies Easy and Advanced operating modes. HP and Epson both get my vote for most-terrific interface design. HP's ScanJet 4100C software even lists and numbers options in the order that you should use them.

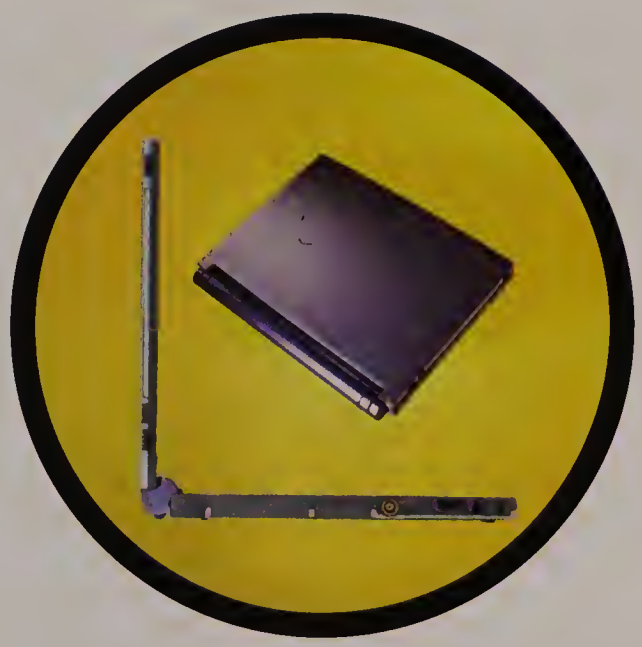
A few models here come with a transparency adapter. Agfa's $699 DuoScan T1200, Epson's $299 Perfection 636, and Plustek's $149 OpticPro 9636T all accommodate transparencies, 35mm slides, and film negatives. At an additional cost, you can attach a transparency adapter on the HP and Umax scanners. Some lower-priced models offer this ▶

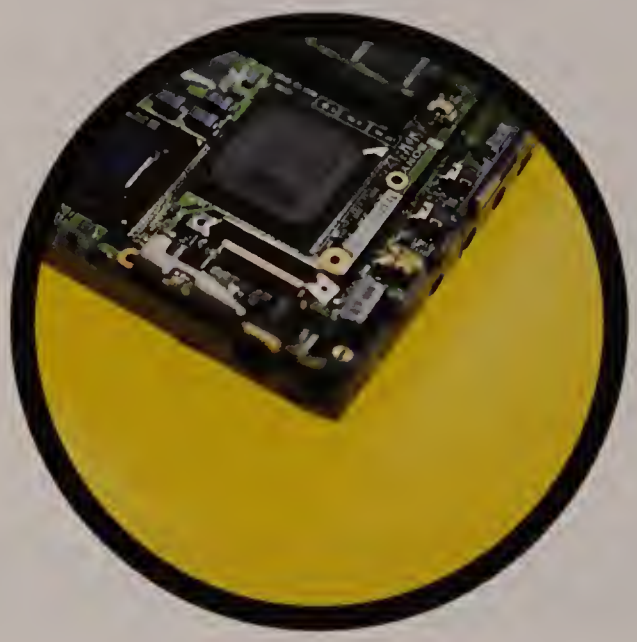
HP'S $199 SCANJET 4100C (at press time replaced by the $199, 600-dpi 4200C) supports a 300-dpi optical resolution and sports two buttons for scanning an image and for automatically launching its scanning software. The $129 Acer model has a 600-dpi optical resolution.

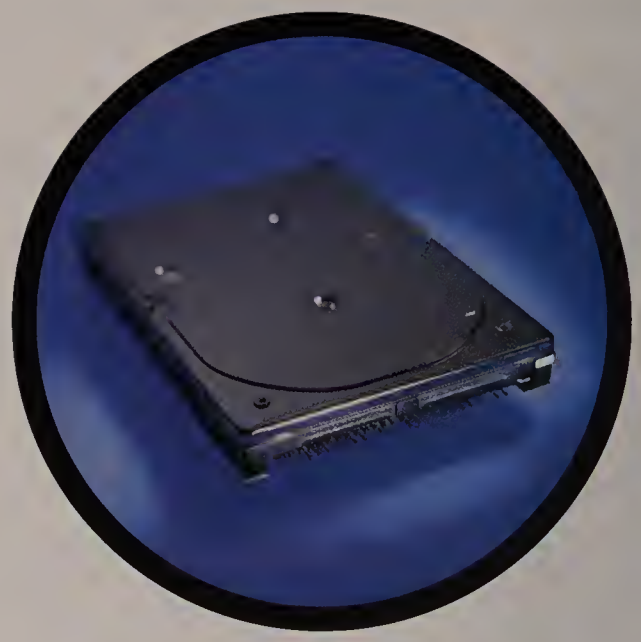
SONY

AGONIZE

[over the stunning array of Sony VAIO® Notebook choices.]

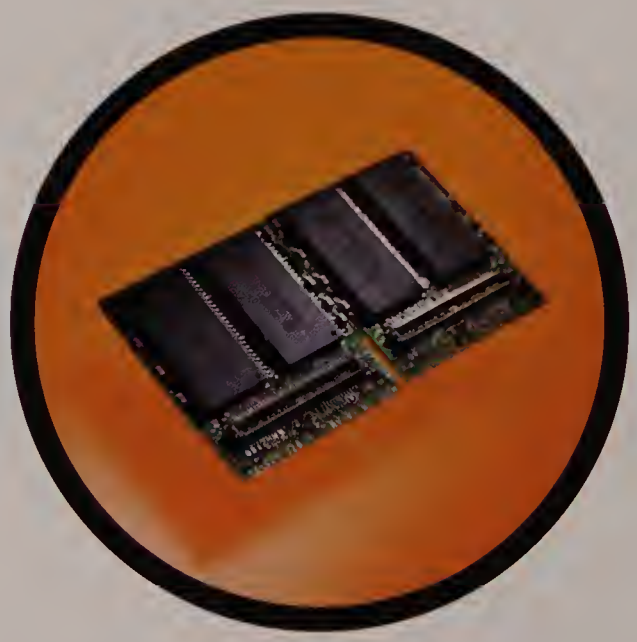






CUSTOMIZE

[your processor, RAM and hard drive
only at Sony VAIO Direct℠.]



ACCESSORIZE

[from the growing gallery of
Sony VAIO® compatibles and add-ons.]

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Great Products. Great People.

GET THE SON

VAIO 505 SUPERSLIM NOTEBOOK

So light, yet so powerful.

Only 2.7 lbs. and .9" thin. The newest Sony VAIO® 505 SuperSlim Notebooks ar
and slimmer than before. Each sports a light, durable magnesium-alloy case ins
you'll find: an Intel® Pentium® processor with MMX™ technology; crisp, clear d
keyboard; heavy-duty hard drive; built-in modem; **Programmable Power Key**
access to your e-mail, calendar or browser; plus **Signature Capture** so you ca
inal documents in your own handwriting. What more (or less) could you wan

Pre-installed Software (both models):
- Windows® 98
- Microsoft® Outlook™ 98
- Microsoft Works
- Adobe PhotoDeluxe®
- Sony Picture Gear™
- Sony DVgate™ Still

SONY Exclusive Features (both models):
- i.LINK™ (IEEE-1394) port for DV still image capture
- Pen-based signature and drawing capture
- Programmable power key-Unattended e-mail retrieval

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THE NEW ALL-IN-ONE NOTEBOOK

Everything you want in a notebook—built right in

There's a lot more than an Intel processor inside this slim notebook (less tha
thin). Now, the DVD-ROM or CD-ROM, floppy disk and hard drives are all bui
have to hook up any externals. All three models have even bigger screens th
with dual battery capability for up to 7 hours† of on-the-go power. Plus, each
loaded with a host of software for some powerful multimedia capabilities. Th
didn't add to this notebook was weight and size. So you can see why **3MAX**
MaxMobility, MaxScreen and **MaxBattery** plus a whole lot more.

3MAX+ Features (all models):
- MaxMobility: Less than 7 lbs.††; 1.6" thin
- MaxBattery: 2X battery life
- MaxScreen: 14.1" XGA TFT

Plus:
- All-in-one design
- i.LINK (IEEE-1394) port for DV still image capture

Pre-installed Software (all models):
- Windows 98
- Microsoft Outlook 98
- Microsoft Works
- Adobe PhotoDeluxe
- Sony Picture Gear
- Sony DVgate Still

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†Using optional second battery in floppy drive bay. Battery life may vary ba
††With weight saver in floppy drive bay.

THE NEW C1 PICTUREBOOK™

PCG-C1X **$2,299.99**

The new Sony notebook with a built-in digital camera.

This compact wonder makes using digital pictures in documents, e-mail or Websites easier than ever before—because the digital camera is built right in. Just swivel the camera toward your subject and capture video clips or still shots. Pre-installed software allows you to create animated special effects or even a 360° panorama from still frames. Not much bigger than a paperback book, it also delivers full notebook functionality that lets you run Windows 98.

As low as $41.51 a month*

- Intel Pentium processor with MMX technology 266 MHz
- 64 MB SDRAM
- 4.3 GB hard drive
- Built-in CCD video camera
- 8.9" XWIDE TFT LCD Display (1024 x 480)
- Windows 98
- Adobe PhotoDeluxe
- Pre-installed original Sony multimedia software with Smart Writer™, Smart Publisher™ and Smart Capture™
- 17mm pitch/2mm stroke keyboard
- 2.5 lbs., 1.5" thin
- i.LINK (IEEE-1394) port for DV still image capture
- Magnesium-alloy display housing
- Integrated Universal Serial Bus (USB)
- Integrated V.90 modem
- External USB floppy drive

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505TS — $1,999.99

2,500 FREE frequent flyer miles with purchase (includes United Airlines, American, USAir and Northwest/ Continental).

FREE USB Mouse with upgrade, a $49.99 value

Customize with:
★ Upgrade to 128 MB RAM add: $300.00

As low as $36.09 a month*

- Intel Pentium processor with MMX technology 300 MHz
- 64 MB SDRAM (expandable to 128 MB)
- 4.3 GB fixed hard drive
- 0.9" thin; 2.7 lbs.
- 10.4" SVGA Active Matrix Display
- V.90 modem
- High-capacity Lithium-Ion battery
- Touch pad with pen operation
- Bundled port replicator and external floppy disk drive
- One type II PC Card slot with card bus zoomed video support

505TX — $2,499.99

2,500 FREE frequent flyer miles with purchase (includes United Airlines, American, USAir and Northwest/ Continental).

FREE USB Mouse with upgrade, a $49.99 value

Customize with:
★ Upgrade to 128 MB RAM add: $300.00

As low as $45.12 a month*

- Intel Pentium processor with MMX technology 300 MHz
- 64 MB SDRAM (expandable to 128 MB)
- **6.4 GB fixed hard drive**
- 0.9" thin; 2.7 lbs.
- **10.4" XBRITE XGA Active Matrix Display**
- V.90 modem
- High-capacity Lithium-Ion battery
- Touch pad with pen operation
- Bundled port replicator and external floppy disk drive
- One type II PC Card slot with card bus zoomed video support

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F190 — $3,299.99 plus $100.00 rebate

10 FREE DVD rentals from NetFlix™ with purchase' (offer expires 5/31/99).

Order a 2nd Lithium-Ion battery now and get a $125 rebate. (Rebate period 2/1/99-4/7/99.)

FREE USB Mouse with upgrade, a $49.99 value

Customize with:
★ Upgrade to 128 MB RAM add: $200.00

As low as $59.56 a month*

- Intel Pentium II processor 366 MHz
- 64 MB SDRAM
- 6.4 GB hard drive
- 2X DVD-ROM drive
- 14.1" XGA TFT Display
- V.90 modem
- High-capacity Lithium-Ion battery, dual battery capability
- 128-bit graphics acceleration
- Built-in stereo speakers
- Digital touch pad
- Digital video movie editing capability via i.LINK and DV Camcorder

3MAX+™

F180 — $2,499.99

10 FREE DVD rentals from NetFlix with purchase' (offer expires 5/31/99).

Order a 2nd Lithium-Ion battery now and get a $125 rebate. (Rebate period 2/1/99-4/7/99.)

FREE USB Mouse with upgrade, a $49.99 value

Customize with:
★ Upgrade to 128 MB RAM add: $200.00
★ Upgrade to 6.4 GB hard drive add: $200.00

As low as $45.12 a month*

- Intel Pentium II processor 333 MHz
- 64 MB SDRAM
- 4.3 GB hard drive
- 2X DVD-ROM drive
- 14.1" XGA TFT Display
- V.90 modem
- High-capacity Lithium-Ion battery, dual battery capability
- 128-bit graphics acceleration
- Built-in stereo speakers
- Digital touch pad

3MAX+™

C1X ACCESSORIES

- **External 14X CD-ROM Drive** PCGA-CD5: **$299.99**

- **AC Adapter** PCGA-AC51: **$99.99**
- **Long-Life Rechargeable Battery Pack** PCGA-BP12: **$249.99**
- **Standard Rechargeable Battery Pack** PCGA-BP11: **$149.99**
- **Battery Charger** PCGA-BC1: **$199.99**

THE 838 MODULAR NOTEBOOK

Swap any drives and battery to take only what you need.

The new Sony VAIO 838 Notebook is just what every power-hungry office nomad is looking for. More power and portability. Packed with our road-warrior **3MAX**™ features, this notebook offers **MaxMobility** (under 6 lbs. and less than 1.75" thin), **MaxScreen** (a full-color 13.3" high-resolution XGA display) and **MaxBattery** (up to 8 hours of power without a charge). Plus, the DVD-ROM drive, floppy disk drive, second battery[§] or second hard drive[§] are all interchangeable so you take only what you need. All told, it's a mighty powerful PC wrapped in a light and slim package.

Pre-installed Software:

- Windows 98
- Microsoft Outlook 98
- Microsoft Works
- Adobe PhotoDeluxe

3MAX Features:

- MaxMobility: Less than 7 lbs.[Δ]; 1.75" thin
- MaxScreen: 13.3" Active Matrix LCD Display
- MaxBattery: 2X battery life[ΔΔ]
- Using optional second battery in floppy drive bay

[§]Optional purchase required.
[Δ]With weight saver floppy in drive bay.
[ΔΔ]With optional second hard drive and removable drive bay. Battery life may vary based on usage.

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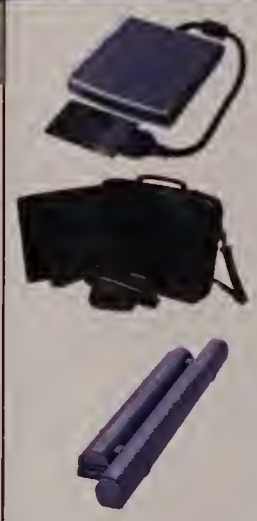
505 ACCESSORIES



- **External 14X CD-ROM Drive**
  PCGA-CD5: **$299.99.** AC adapter and PC Card interface supplied. Requires AC power for operation.
- **Leather Carrying Case**
  PCGA-CC5: **$149.99**—after **$50** instant rebate. Custom case includes detachable compartments for all of its accessories.
- **Rechargeable Battery Pack**
  Long-Life: PCGA-BP52: **$299.99.** Up to 7 hours with 505TS; up to 6 hours with 505TX.
  Standard: PCGA-BP51: **$149.99.** Up to 3 hours with 505TS; up to 2.5 hours with 505TX.
  Note: Battery life may vary based on usage.

- **Port Replicator**
  PCGA-PR5: **$99.99.** Ports: Parallel printer, PS/2® keyboard, PS/2 mouse and VGA monitor.
- **Stereo Speakers**
  PCGA-SP51: **$99.99.** External clip-on speakers that give you even more sound.
- **AC Adapter**
  PCGA-AC51: **$99.99.** Get an additional AC adapter and keep one at home and one at work.
- **Battery Charger** (available April 1999)
  PCGA-BC5: **$199.99.** You can charge 2 batteries simultaneously. Compatible with both Long-Life (L) and Standard (S) batteries.

F160 $1,999.99

Order a 2nd Lithium-Ion battery now and get a $125 rebate. (Rebate period 2/1/99-4/7/99.)

FREE USB Mouse with upgrade, a $49.99 value

Customize with:
★ Upgrade to 128 MB RAM add: $200.00
★ Upgrade to 6.4 GB hard drive add: $200.00

As low as $36.09 a month*

- Intel Pentium II processor 300 MHz
- 64 MB SDRAM
- 4.3 GB hard drive
- 24X MAX CD-ROM drive
- 14.1" XGA TFT Display
- V.90 modem
- High-capacity Lithium-Ion battery, dual battery capability
- 128-bit graphics acceleration
- Built-in stereo speakers
- Digital touch pad

3MAX+™

ALL-IN-ONE ACCESSORIES

- **AC Adapter**
  PCGA-AC71: **$99.99.** Get an additional AC adapter and keep one at home and one at work.
- **Rechargeable Battery Pack**
  PCGA-BP71: **$249.99.** Up to 7 hours with F Series. Note: Battery life may vary based on usage.
- **Network Port Replicator**
  PCGA-PRF1: **$199.99.** Built-in Ethernet® 10 Base-T, USB parallel, serial VGA, DC-in, PS/2 keyboard and PS/2 mouse.

838 $2,999.99

10 FREE DVD rentals from NetFlix with purchase' (offer expires 5/31/99).

Order a 2nd Lithium-Ion battery now and get a $125 rebate. (Rebate period 2/1/99-4/7/99.)

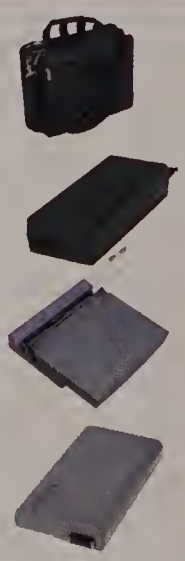
Customize with:
★ Upgrade to 128 MB RAM add: $200.00

As low as $54.14 a month*

- Intel Pentium II processor 366 MHz
- 64 MB SDRAM
- 6.4 GB removable hard drive
- 2X DVD-ROM drive
- Removable drive bay for DVD-ROM drive, floppy disk drive, second battery, second hard drive
- 13.3" XGA TFT LCD Display
- V.90 modem
- High-capacity Lithium-Ion battery, dual battery capability
- 128-bit graphics acceleration
- Built-in stereo speakers
- Digital touch pad

3MAX™

838 ACCESSORIES



- **Carrying Case**
  PCGA-CC7: **$99.99.** Air-cushioned, this case holds your notebook, AC adapter, extra battery and floppy or CD-ROM drive.
- **AC Adapter**
  PCGA-AC71: **$99.99.** Get an additional AC adapter and keep one at home and one at work.
- **Network Docking Station**
  PCGA-DB8: **$599.99.** Offers everything you need to connect your notebook to your company's PC network.
- **Rechargeable Battery Pack**
  PCGA-BP71: **$249.99.** Up to 8 hours with 800 Series. Note: Battery life may vary based on usage.
- **Extra 4 GB Hard Drive**
  PCGA-HD740: **$499.99.** Placing a second 4 GB hard drive in the versatile drive bay increases your storage capacity for large applications.

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O DIRECT.

Sony Digital Mavica Camera

This sleek, semi-pro Digital Mavica® Camera gives you instant imaging and endless storage because it captures all your pictures on floppy disk. Just take your photos and transfer them to any Sony PC—without wires or adapters. Then e-mail them to anyone, anywhere in the world. (For details on the full line of Digital Mavica Cameras, see the reverse.)

Model: MVC-FD91
Price: $999.00

Sony IC Chip Recorder

With the Sony IC Chip Recorder, you get a palm-sized device (just 2.5 oz.) that captures your voice with digital clarity. And links right to your Sony PC. Giving you a swift, effortless way to save, download and e-mail your voice messages and memos. Holds up to 24 minutes of recording, in five separate message categories. Includes digital VOR that starts and stops with your voice, so you never miss a single word.

Model: ICD-70PC
Price: $199.95

Sony PC Glasstron Monitor

A big-screen display that's portable? The PC Glasstron™ monitor creates a virtual 30" high-resolution image—for your eyes only. It's head-mounted to offer you the most in mobility and privacy. And its built-in headphones make your multimedia experience even more amazing. Just plug it into your notebook and other video sources and let the games begin◊.

Model: PLM-S700
Price: $2,599.00
As low as $46.92 a month*

◊See advisories on back page.

Memory Stick IC Recording Media

Introducing the next generation of digital data storage—Memory Stick™Media. Smaller than a stick of gum, but with five times the storage capacity (MSA-8A model) of a standard 3.5" floppy disk, Memory Stick Media is expected to become the new industry standard for storage and transfer media. Plus, it makes it even easier for you to transfer images, sounds, data and text between cameras, computers and more.

4 MB Memory Stick Media Model: MSA-4A Price: $29.99
8 MB Memory Stick Media Model: MSA-8A Price: $39.99

Sony now builds your PC to order, so don't settle for anything less than a perfect fit. All PC's shipped within 7 days straight from the factory‡ All other products shipped within 24 hours‡

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SN331-PC

SONY DIGITAL MAVICA CAMERAS

The world's only floppy-disk digital camera.

The Sony Digital Mavica® Camera isn't just the world's favorite digital camera. It's the only digital camera in the world to use a standard floppy disk for film. So it works seamlessly with any PC. And gives you an effortless way to do some pretty amazing things.

Just point, shoot and preview your images on the camera's color LCD display. Pop the floppy in your PC and e-mail your images, post them to the Web or use them to create a polished presentation. Some models even let you record up to 60 seconds of live video and audio on a single floppy. So you can do things like e-mail a video clip of your newborn baby—complete with sound—just minutes after she's born.‡‡

It's easy to imagine all the amazing things you could do with a Digital Mavica Camera. The tough part is deciding which of our five models is best suited to helping you make it all happen.

Sony Citibank Platinum Select Card

Use the Sony Citibank® Platinum Select℠ Card with any purchase and get triple Sony points towards Sony movies, music, electronics and games. Apply today.

Choose from four different models:

MVC-FD91 **$999.00**

Designed for the serious photo enthusiast, this semi-pro model is loaded with top-of-the-line features, like MPEG audio/video capabilities, a 14X Optical Zoom lens, Optical SteadyShot® and special manual controls.

MVC-FD81 **$799.00**

This model comes with most of the perks of our semi-pro model, plus all the great features of our standard Mavica Cameras. Highlights include: XGA picture quality, as well as MPEG audio/video and voice memo capabilities.

MVC-FD71 **$699.00**

Designed specifically for capturing images for use in e-mail, Websites and presentations, this model offers VGA picture quality, 10X Optical Zoom and a sleek, lightweight design.

MVC-FD51 **$499.00**

This model offers practical features such as VGA picture quality, a 2X floppy disk drive, a color LCD screen and built-in Intelligent Flash.

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SN331-PC

feature, but their color quality is a far cry from that of the pricier Agfa DuoScan.

In terms of bundled software, every scanner here includes image editing and OCR software, and most of them have a document management tool. Our favorite photo-editing applications include Adobe's PhotoDeluxe and Ulead's IPhoto; both packages excel at image manipulation and at integrating scans into greeting cards, calendars, and other boilerplate documents (see "Picture Perfect," February 1999, www.pcworld.com/feb99/photoedit, for more on photo-editing applications).

THE FASTEST scanner on the chart, HP's $399 ScanJet 6200C, is also the only model that provides both SCSI and USB connections. The $399 Umax Astra 2400S is the second-speediest device in our Top 10. And, though bulky, it accommodates legal-size (8.5-by-14-inch) paper.

The Umax Astra 2400S ships with a limited edition of Adobe Photoshop, while the Agfa DuoScan T1200 includes a full version of Corel Photo-Paint 8—time-demanding but feature-rich apps.

Every scanner here also comes with OCR software, which reads scanned text and converts it to an editable word processing document. All but three scanners we tested (the Pacific Image ScanAce 1236P, Visioneer 6100B, and PaperPort OneTouch 5300) include variations of Caere OmniPage or Xerox TextBridge, two of the leading OCR programs on the market.

To judge the scanners' OCR capabilities, I scanned a two-column article from a newspaper and selected one headline and one sentence within the article for comparison (a total of 70 characters). More than 90 percent accuracy, or fewer than seven errors, was considered a success; otherwise, you ▶

pixel perfect

The Settings You Need For Great Scans

AFTER SCANNING PHOTOS or pages of text, you're most likely going to post them on the Web, print them out, or work on them in an image editing or word processing application. Different destinations require varying resolutions, color depths, and file formats. And you don't need the highest settings all the time.

For example, if you scan images for Web use, you need a resolution of only 75 dots per inch (dpi). Scanning at a higher resolution won't make any difference when viewed on screen. Plus, it'll take longer to scan at high res. On the other hand, if you want to scan a photo and print it later, you'll want a resolution of 300 dpi or higher.

Resolution and color depth settings determine not only how good the image will look, but also how much space it will consume on your hard drive (and in memory, if you decide to open it from within an application).

If you scan a picture at 150 dpi, each square inch contains 150 by 150 dots, or 22,500 total. Doubling the resolution to 300 dpi results in 90,000 dots per square inch—four times as many. When you double the resolution, you also quadruple the file size, meaning it takes longer to download, copy to a disk, or print.

A similar rule applies to color depth. Higher color depth means larger file sizes, with a color photo consuming 24 times as much space in RAM as it would if it were black and white.

Our advice: Scan at just the resolution and color depth you need. After all, if you decide later that you want another file with a higher resolution or more color, you can rescan the image in a minute or so. The chart below shows which resolution, color depth, and file format settings to use based on the destination and source of your scan. —D.M. and G.A.

DESTINATION	Image source	Resolution (dpi)	Color depth	File format	Size of 4-by-6-inch scan (in RAM)[1]
Black-and-white publication	line art	600	black and white	TIFF	1MB
	photograph	300	8-bit gray scale	TIFF or JPEG	2.1MB
Color publication or color printer	negative or slide	1200	24-bit color	TIFF or JPEG	6.2MB
	photograph	300	24-bit color	TIFF or JPEG	6.2MB
Laser printer	line art	300	black and white	TIFF	264KB
	photograph	150	8-bit gray scale	JPEG	527KB
OCR software	printed text	300	black and white	TIFF or BMP	264KB
Web	color graphic	75	8-bit color	GIF	132KB
	photograph	75	24-bit color	JPEG	396KB

[1] Uncompressed size in RAM. Size on hard drive may be considerably smaller, depending on compression.

might as well enter the text from scratch.

The Pacific Image ScanAce 1236P and its bundled OCR software, NewSoft's Presto Wordlinx, captured the text flawlessly. The Plustek scanner, which uses TextBridge, also achieved 100 percent accuracy, but only after I rescanned the page at a lighter setting (the first setting resulted in no text at all). Most of the other scanners had decent accuracy, but the two Visioneers, which rely on their own OCR software, yielded borderline results, with 7 and 10 errors apiece. Unfortunately, Microtek's ScanMaker X6, which has OmniPage, captured a mere two letters correctly.

The scanners we evaluated come with minimal printed documentation, from a few pages to a single poster-size installation chart. Many vendors include CD-ROM–based documentation, but it was often easier just to figure out the answer on my own. Microtek's PDF documents include neither an index nor hot links, and the table of contents references page numbers that are out of sync with the PDF pages. Worse, the nonchart-making Memorex MaxxScan 6122's primary documentation comes in a paltry WordPad document. By contrast, Agfa, Epson, and HP provide well-linked, well-organized, and thorough PDF files. HP even includes first-rate interactive multimedia tours.

THE $149 MICROTEK model lets you push a button to scan graphics or text pages; it's one of the speediest units in scanning color photos. Visioneer's sluggish, $129 6100B includes one-button scanning, as well as a power button conveniently located on the front of the device.

Service and Support

BEST: Epson Perfection 636

WORST: Pacific Image ScanAce 1236P

IF SOMETHING goes wrong during normal business hours, every vendor offers help. Some companies, including Acer, Pacific Image, Plustek, and Visioneer even pay for the call; Agfa foots the bill for its DuoScan T1200 customers, but SnapScan 1212U owners must call a toll number. If your scanner goes haywire on Saturday or Sunday, support dwindles considerably. Only Acer, IBM, and Plustek answer their phones over the weekend. Canon, Epson, HP, and Umax also provide daytime support on Saturday, but you have to pay for the call.

To rate each company's service quality, I called tech support at least once during business hours. Inspired by a difficulty encountered with the Canon scanner, I asked each vendor about a mechanism that didn't retract after scanning. Unfortunately, Canon's support gave an incorrect response: A representative first urged me to work around the misalignment by centering the artwork on the glass. Then he offered an inventory number so I could return the unit for a new one.

Other companies' recommendations varied. Acer, Artec, and Umax assured me that my only option was to box up the scanner and return it to the store. The Visioneer rep asked me unrelated questions, and *then* told me to take the scanner back to the store. Epson, HP, Microtek, and Plustek supplied the most plausible recommendation for correcting the problem, based on driver modifications: resetting the scanner from the TWAIN driver. An Epson rep even offered to fax me a hard copy of his instructions.

More important than specific recommendations, however, is the way I was treated. At Memorex, I wasn't. Despite five attempts, the company never answered its toll-free number, nor did it provide an option to leave a message. Agfa requires a serial number or a sales receipt before taking a call. Microtek kept me hanging for 23 minutes, while Umax made me wait for 32; both were toll calls.

Eight reps took my phone number in case I got disconnected. To test whether they'd call back, I deliberately hung up during a conversation. Agfa and IBM technicians called back within 10 minutes. I'm still waiting for the other six.

Deke McClelland is a best-selling author of digital imaging books, including Real World Digital Photography *(Peachpit Press, 1999). Yardena Arar is a senior associate editor and Grace Aquino is a staff editor for* PC World. *Testing performed by Ulrike Diehlmann and Mike Salayko of the PC World Test Center.* ■

BEYOND THE TOP 10

For all scan quality photos and information on handheld scanning devices and scanners (listed below) not on the Top 10, visit PC World Online (www.pcworld.com/apr99/scanners).

- Agfa SnapScan 1212U
- Artec ViewStation AM12S
- Canon CanoScan FB 620P
- IBM IdeaScan
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Processor	Presario 5600i Series Computer with **Pentium®III** processor 500 MHz	Presario 5600i Series Computer with **Pentium®II** processor 450 MHz	Presario 5600i Series Computer with **Pentium®II** processor 450 MHz	Presario 5600i Series Computer with **Pentium®II** processor 400 MHz
Memory	128 MB 100 MHz SyncDRAM	128 MB 100 MHz SyncDRAM	96 MB 100 MHz SyncDRAM	128 MB 100 MHz SyncDRAM
Hard Drive	16.8 GB UltraDMA Hard Drive	13.0 GB UltraDMA Hard Drive	13.0 GB UltraDMA Hard Drive	13.0 GB UltraDMA Hard Drive
DVD/CD ROM	32X Max Speed CD-ROM Drive	32X Max Speed CD-ROM Drive	6X DVD-ROM Drive	32X Max Speed CD-ROM Drive
Modem	56K ITU V.90 Modem	56K ITU V.90 Modem	56K ITU V.90 Modem	56K ITU V.90 Modem
Audio Card (Download speeds may vary)	Aureal 8820 PCI Audio Card	Aureal 8820 PCI Audio Card	Aureal 8820 PCI Audio Card	Aureal 8820 PCI Audio Card
AGP Graphics	Diamond Viper 550 AGP W/ 16 MB SDRAM Video Memory	ATI Rage LT Pro 2X AGP W/ 8 MB SGRAM Video Memory	ATI Rage LT Pro 2X AGP W/ 8 MB SGRAM Videa Memory	ATI Rage LT Pro 2X AGP W/ 8 MB SGRAM Video Memory
Ethernet Port	Integrated 10 Mbps Ethernet Port,Cable Modem Ready	Integrated 10 Mbps Ethernet Port,Cable Modem Ready	Integrated 10 Mbps Ethernet Port,Cable Modem Ready	Integrated 10 Mbps Ethernet Port,Cable Modem Read
Software	Windows® 98 Microsoft® Office Small Business Edition	Windows® 98 Microsoft® Office Small Business Edition	Windows® 98 Microsoft® Office Feature Home Collection	Windows® 98 Microsoft® Office Small Business Edition
Monitor	Presario FP700 15" TFT Flat Panel Monitor (15" VIA) (Shown)	Compaq V910 19" Monitor (18.0 VIA) (Not shown)	Compaq V720 17" Monitor (15.9 VIA) (Not shown)	Compaq V720 17" Monitor (15.9 VIA) (Not shown)
Speakers	JBL Pro Speakers	JBL Pro Speakers	JBL Pro Speakers	JBL Pro Speakers
Options	Iomega® Zip BUILT-IN™ Drive W/ 1 Diskette	Digital Creative Imaging Center		
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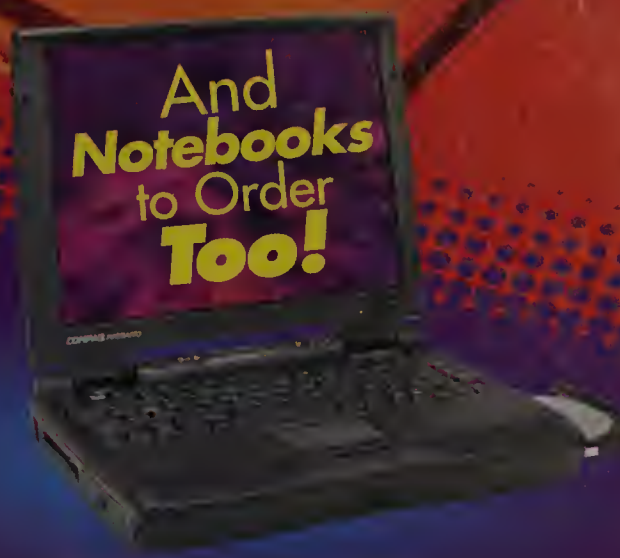

	Notebook		Notebook	
RESARIO 5600i/350	PRESARIO 1900/366	PRESARIO 1900/333	PRESARIO 1600i/300	PRESARIO 1600i/266
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4 MB 100 MHz ynCDRAM	128 MB SyncDRAM	128 MB SyncDRAM	64 MB SyncDRAM	64 MB SyncDRAM
0.0 GB ltraDMA Hard Drive	6.4 GB UltraDMA Hard Drive	6.4 GB UltraDMA Hard Drive	4.0 GB UltraDMA Hard Drive	4.0 GB UltraDMA Hard Drive
X DVD-ROM Drive	2nd Generation DVD-ROM in detachable Wedge Base	2nd Generation DVD-ROM in detachable Wedge Base	2nd Generation DVD-ROM	24X Max Speed CD-ROM
6K ITU V.90 Modem	56K ITU V.90 Modem	56K ITU V.90 Modem	56K ITU V.90 Modem	56K ITU V.90 Modem
ureal 8820 PCI udio Card				
TI Rage LT Pro 2X GP W/ 8 MB SGRAM ideo Memory	256 Bit Graphics With 2.5 MB Video Memory	256 Bit Graphics With 2.5 MB Video Memory	256 Bit Graphics With 2.5 MB Video Memory	256 Bit Graphics With 2.5 MB Video Memory
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Vindows® 98 Microsoft® Office Feature ome Collection	Windows® 98 Microsoft® Office Small Business Edition	Windows® 98 Microsoft® Office Small Business Edition	Windows® 98 Microsoft® Office Feature Home Collection	Windows® 98 Microsoft® Office Feature Home Collection
ompaq V720 17" Monitor (15.9 VIA) (Not shown)	13.3" XGA TFT Active Matrix Display (Not shown)	13.3" XGA TFT Active Matrix Display (Not shown)	14.1" XGA TFT Active Matrix Display (Not shown)	13.3" XGA TFT Active Matrix Display (Not shown)
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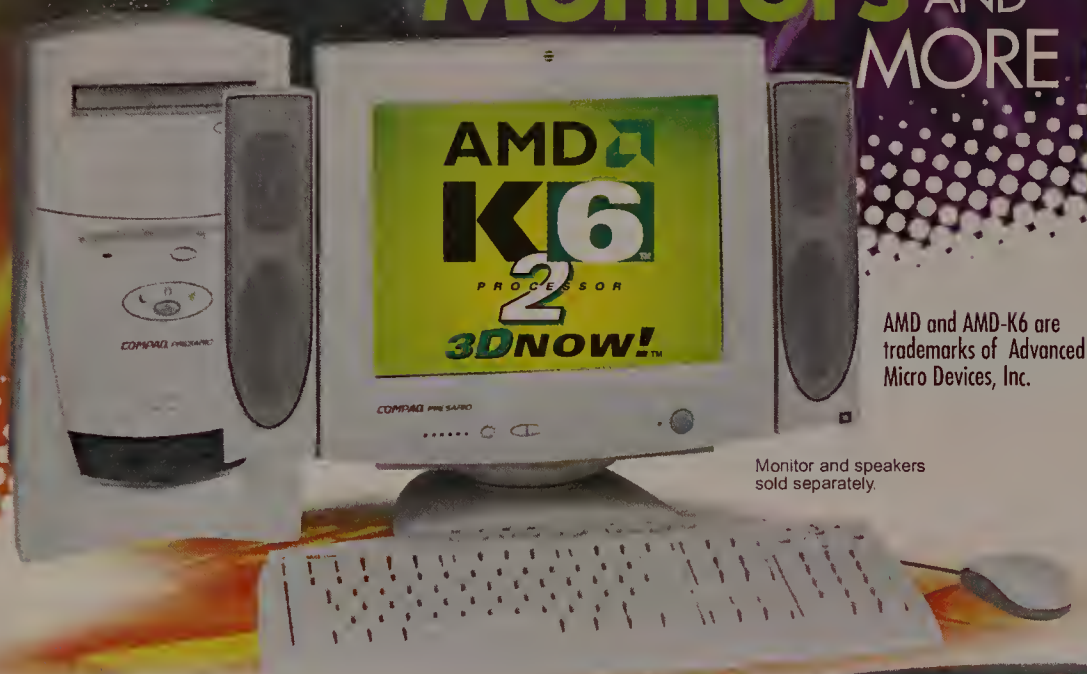

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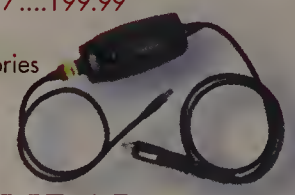

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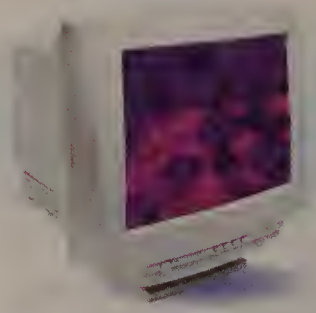

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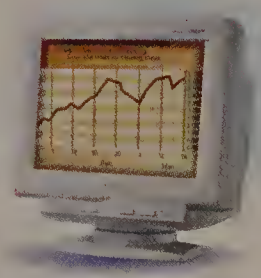

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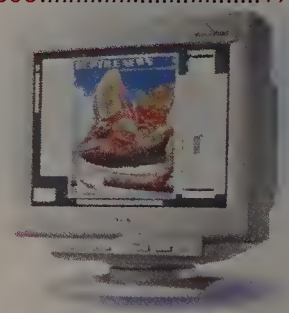

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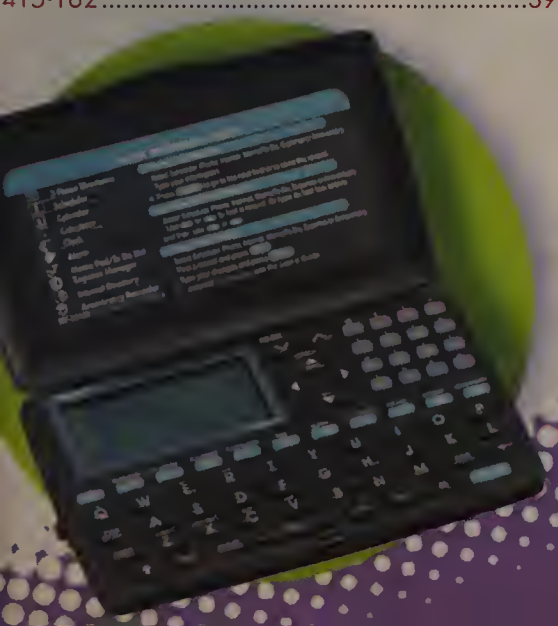

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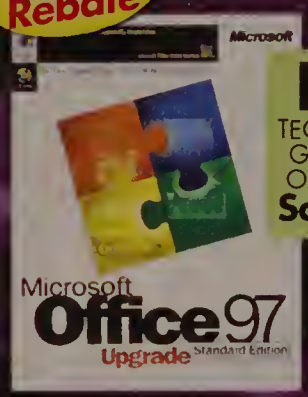

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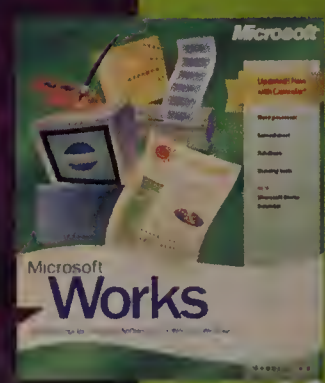

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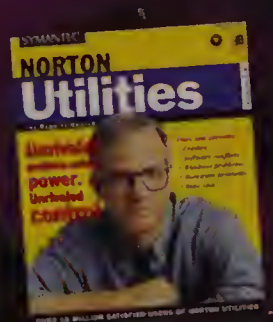

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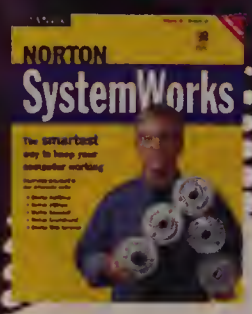

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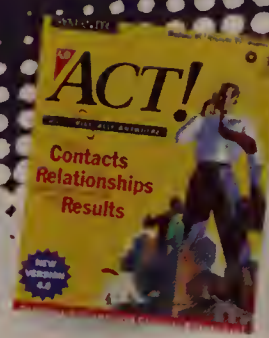

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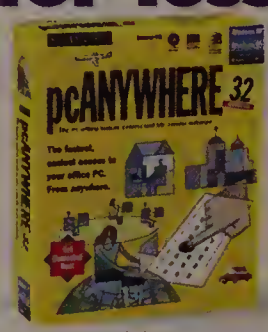

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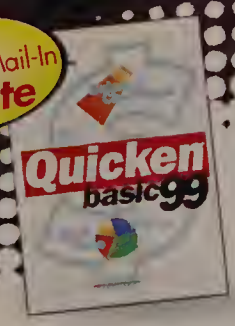

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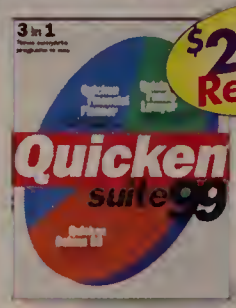

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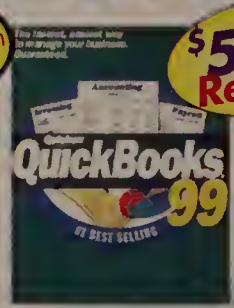

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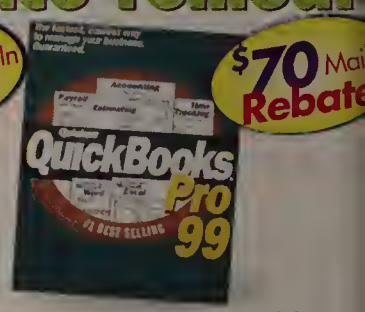

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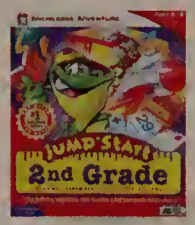

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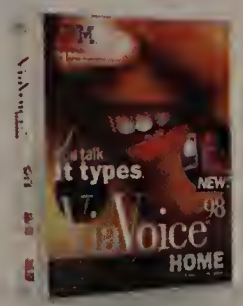

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379-166.....79.99
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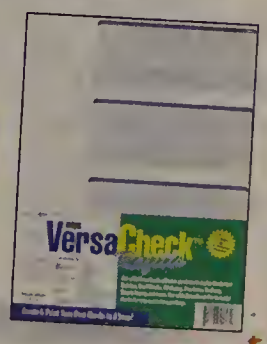

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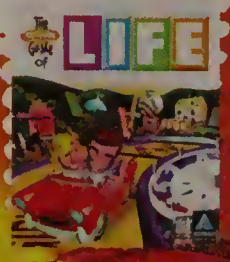
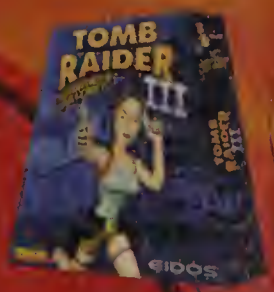


427-541.....29.99

29-111.....19.99



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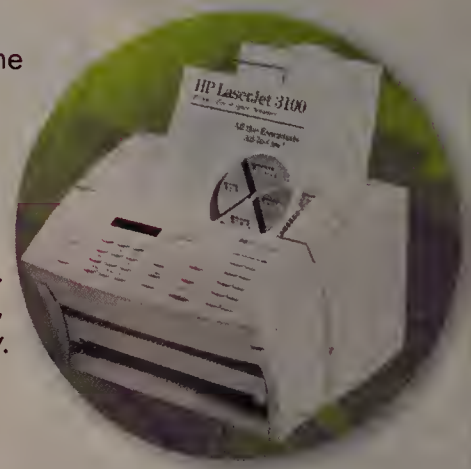

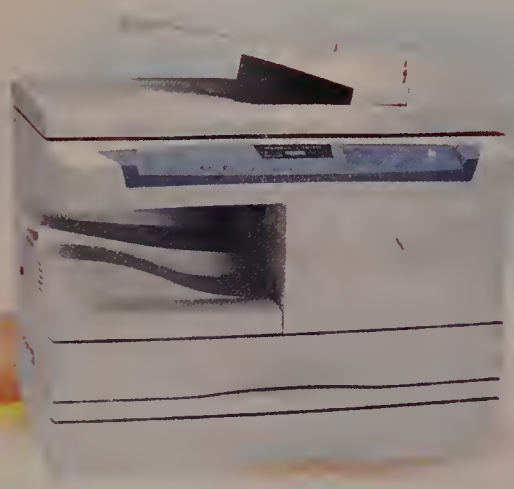

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696-867 ..... 699.99

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HP LaserJet 1100 se 417-491 ..... 399.99
Laserjet 1100Ase 417-473 ..... 499.99

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HP LJ4000se 285-944 ..... 1,149.99

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browsing for housing

A step-by-step guide to buying a home on the Web

ILLUSTRATIONS BY ALISON SEIFFER

BY ANNE KANDRA

When Dave Husson, a software engineer in New Hampshire, got a job offer in Cape Cod, he and his wife Laura didn't call a real estate agent to help them find a new home. They went online.

With two young sons, they made their first priority finding a safe community that had good schools. They also wanted an affordable place in a small-town setting that was reasonably close to Dave's new job—and of course, not far from the beach. The couple wound their way through the virtual world of property listings, mortgage calculators, and loan agencies. And amid the flood of information traveling at 56 kbps into their home, they found details about a community that their own parents would have searched for in a much less modern time.

"At sites like virtualcapecod.com and capecodusa.com we found all the specific regional information we were looking for," says Laura. "At one point, we came across the mission statement for the Sandwich School District and thought, 'That's someplace we could live.'" After several fact-finding trips to the Cape, the Hussons settled in East Sandwich, and they've never looked back.

The Hussons' approach to home buying is becoming more and more common. Nearly 6 million visits are made to the National Association of Realtors' Web site, Realtor.com, each month, and an estimated 30 percent of all home buyers use the site at some point during their home search, says Stuart Wolff, chairman and CEO of RealSelect, the company that runs Realtor.com.

The online approach makes sense. In the early stages of home buying, using resources on the Web can save you time, money, and even your sanity. You can pore over home listings at your own pace, and then tell your agent which properties you want to see. You can search for your loan online and, if you decide to buy it there, pick up a new DVD-ROM player with the money you'll save in broker's fees. Furthermore, you can examine crime statistics, school rankings, and other community information that will help you narrow your search.

But beware: Hundreds of real estate sites are out there, many of which are poorly designed or have such limited information that they aren't worth the download time. We went online in search of the best sites to help you find your bearings in what can be an overwhelming process. We'll step you through the various stages of home shopping on the Web—from learning what to expect and prequalifying for a loan to casing neighborhoods, finding an agent, and homing in on the right house for you.

The Husson family went online to find their dream home, a three-bedroom Cape near the coast.

Step 1: Get Up to Speed

BUYING A HOUSE is notoriously complicated. If you're thinking of taking the plunge, you should start by finding out as much as you possibly can about the process. And even if you've bought a house before, you could probably stand a refresher course on the basics.

To learn the difference between an APR (annual percentage rate) and an ARM (adjustable rate mortgage), to get tips on how to find a reliable inspector, or to compile questions for your real estate agent, head over to Microsoft's HomeAdvisor (www.homeadvisor.msn.com). At the Getting Started section of this site, you'll find a clear overview of everything from the buying decision to closing, with advice, lists of relevant questions, and even a glossary of real estate terms.

The guided checklist for first-time buyers is particularly helpful. It asks such questions as, "Do you feel peer pressure to buy a home now?" and "How do you think owning a home will change the quality of your life?" The site then offers canned advice based on your answers. Some of this material may seem a bit, well, obvious: If you don't drive, the site recommends you look for a home within walking distance of shops and public transportation. (Check.) But you also get plenty of useful tools, like a financial worksheet that tells you whether you

should rent or buy. Go through the checklist first: You may be surprised to learn that now is not the best time to buy.

If you do decide to take the plunge, you'll need to figure out whether you really have the wherewithal to go after that four-bedroom contemporary overlooking the beach. Almost every real estate site on the Web includes a calculator to help you determine how much house you can afford. Simply enter your gross income, your expected monthly debt payments, as well as your cash reserves for a down payment and loan fees, and—ka-ching!—the ideal price range for you appears.

Most of these calculators assume you'll dedicate about a third of your monthly income to your mortgage payment—a good rule of thumb no matter how you plan to search for your dream home.

HomeAdvisor's calculator also provides low- and high-end ranges for conservative and aggressive buyers, respectively. Getting this information is quick and painless: HomeAdvisor defines terms, explains the differences between various types of loans, offers online access to your credit report, and tells you how you can improve your credit rating if some of the checks in your past were made of low-grade rubber.

Step 2: Prequalify for a Loan

WHILE YOU'RE THINKING about dough, you should go ahead and get prequalified for a loan. What? Before you've started looking at properties? Yes, prequalifying for a loan before you hunt down a house will save you time when you're ready to place a bid—a valuable advantage in a competitive market. Some sellers won't even let you in the door unless you have a prequalification letter in hand.

Because such letters are based on financial information that has not as yet been verified by any lender, you can get prequalified—for free and usually within a few minutes—by any of a number of real estate Web sites, including HomeAdvisor.

Your best bet, though, is to get prequalified at a dedicated financial site such as E-Loan (www.eloan.com), HomeShark (www.homeshark.com), or QuickenMortgage (www.quickenmortgage.com). Aside from offering a range of loans and lenders, each of these sites is easy to use and provides extensive financial data, such as payment strategies and the tax implications of home buying. All three are secure sites, too, and prequalifying doesn't obligate you to apply for a loan or even communicate further with a particular lender.

The process is simple: Answer a series of questions, inputting your monthly income and debt payments, an estimated loan amount, and the state in which you plan to buy property. If the numbers add up, your prequalification letter is just a few clicks away. HomeShark generates its own generic letter, while QuickenMortgage and E-Loan assess the information you've provided and scan national and regional lending companies to find actual available loans for which you might qualify. Select a loan from the resulting list, and print the form letter.

QuickenMortgage is an excellent site for first-time buyers because it offers both clear explanations of each step of the loan application process and recommendations that are tailored to your personal ▶

home on the web

COMMUNITY INFORMATION

HomeAdvisor
(www.homeadvisor.msn.com)
Want to know what the folks in Emerson, Georgia, are watching on TV? (*Married with Children.*) Or what the population of Powder River, Wyoming, is? (84.) If you're looking for demographic information, HomeAdvisor has the scoop, though its tendency to stereotype soon grows tiresome. You'll find school reports (updated quarterly) and crime statistics here, too.

Homefair.com
(www.homefair.com)
From weather reports to cost-of-living comparisons to SAT scores, this site posts a range of helpful information, relocation tools, and links to local services. The catch? To obtain more detailed reports, you have to reveal your address and phone number, which means you may become prey to telemarketers.

HOME LISTINGS

HomeScout
(www.homescout.com)
This site, with over 750,000 listings, is easy to use and links seamlessly with HomeShark. But it's less customizable than other sites; and since it draws its material from various sources, property listings are presented inconsistently and updates can be sporadic.

Realtor.com
(www.realtor.com)
This real estate powerhouse lists 1.3 million properties, plus maps, photos, and community facts.

MORTGAGE INFORMATION

E-Loan
(www.eloan.com)
The most comprehensive lending site, E-Loan had over 65 participating lenders at press time. It also has an online loan-tracking tool and doesn't use cookies.

HomeShark
(www.homeshark.com)
HomeShark features a simple, easy-to-use interface. Furthermore, in our testing, the site consistently hunted down the lowest interest rates among the financial sites here.

QuickenMortgage
(www.quickenmortgage.com)
First-time buyers will find this site easy to use. It also offers clear explanations of each step of the loan application process.

financial situation. HomeShark provides somewhat less guidance, but if you're familiar with the process of acquiring a loan (or if you don't mind spending a few minutes hunting down answers to your questions), you can obtain a prequalification letter there in as little as 15 minutes.

E-Loan's set of procedures is quick and straightforward, too, but the company assumes that you already know such things as the terms of your loan and how many points—each point equal to 1 percent of the entire loan amount—you are willing to pay the lender. E-Loan does, however, have a helpful tracking feature, which lets you log on and check the status of your loan any time you want.

Whichever site you use, you can save hundreds of dollars in broker's fees if you complete the application process and get your loan online. The more direct online approach can also save you a substantial chunk of time. But compare as many loans as possible before you apply for one, to ensure that you get the best rate.

Step 3: Find the Ideal Location

EVERY REAL ESTATE agent will tell you: The location of your home is its most important asset, so you should carefully research the communities you're interested in. If you're lucky, you've already found one you like. But if you're moving across country or have to relocate in a hurry, you may have to depend on third-party data to find a suitable neighborhood.

Fortunately, any real estate site worth its server space provides basic information on a locality's demographics, schools, churches, and cultural centers. No sites are stellar in this realm, but a few stand out: HomeAdvisor, Homefair.com, and Realtor.com.

Realtor.com (www.realtor.com) finds neighborhoods that match your preferences, which makes it a good place to start. After selecting a state, you rate the importance of school performance, area homeowners' education and income levels, crime rate, and type of locale. The site lists suggested communities (grouped by zip code), with the closest matches first. Click on a zip code for more detailed information about a particular area, including a demographic snapshot and school and crime statistics. You can store the names of neighborhoods that interest you in a Personal Planner.

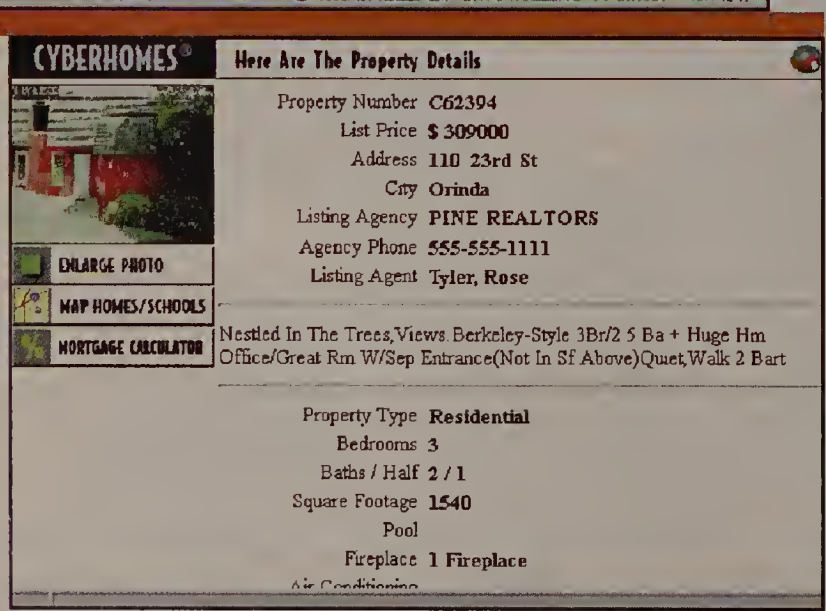
Unfortunately, complete data isn't available for every area (information on rural locales seems especially sketchy), and some of the "facts" I found were inaccurate. Several times, for example, Realtor.com provided statistics for the wrong school district (in one case, the reported district wasn't even in the state I requested). Like most sites, Realtor.com posts a disclaimer warning that it does not guarantee the accuracy of the information it reports and recommending that users independently verify all data. That's good advice.

Fortunately, any real estate site worth its server space provides basic demographic information.

Once you've compiled a list of neighborhoods, go to HomeAdvisor for a little more detail. Using data gleaned by a market research firm, the site identifies areas by zip code, city, or neighborhood and categorizes regional populations into tidy groups, using reductionist titles that—accurate or not—may raise a few hackles.

For example, the site calls the people in zip code 72210 (Little Rock, Arkansas) citizens of "River City, USA": middle-class families who like instant mashed potatoes, fresh-water fishing, and banking by mail. Woodside, California (zip code 94062), is home to the "Winners' Circle," where your neighbors might borrow a wheel of Brie over the back fence before hopping into the Infiniti for a jaunt to the country club. If you can get past the feeling that every latté order you've placed has been tallied somewhere and delivered to Redmond, this site can provide some useful—albeit simplistic—insights.

HomeAdvisor also offers timely, free information on schools and crime. Crime statistics come from local police departments, and the site uses an overall rating of A through D (A is best). It also includes the number and types of crime reported in the past year. School ratings are based on national test scores, amount spent per student, and student-to-teacher ratios.



TOP: CyberHomes returns your search results in map form so you can see just where a property is before you schedule a walk-through. **BOTTOM:** When you click a green icon, up pop key property details including price and agency contact. You might even get a photo of the house.

Like Realtor.com, HomeAdvisor recommends communities based on your criteria. Enter state and region, and assign values to three categories: crime, schools, and neighborhood type. You can view the resulting list of neighborhoods as a map or graph, and you can see home listings in some areas. At press time, the site had 500,000-plus listings, but not all geographic regions were represented. So, depending on where you want to live, you might not find any listings here.

Another glitch: You can't search by zip code, which can make it hard to find specific communities. To make matters worse, the site doesn't list all towns; so if you don't see the one you're looking for, you'll have to figure out what region it's in. And just forget everything you learned in seventh-grade geography class—HomeAdvisor often groups communities by the closest metropolitan area, which puts some Arizona towns in Las Vegas, for example, and parts of New Hampshire in Boston.

For great relocation tools and links to local businesses, take a trip to Homefair.com (www.homefair.com). Though the site won't find specific neighborhoods for you, it will track down local weather reports, compare the cost of living in various cities, and tell you when to line up a mover, fill out your change-of-address forms, and give away your plants. The site also volunteers to identify the best city for you based on your entries for ideal climate, economy, and demographic makeup. And it offers basic information on schools.

More detailed coverage, though, comes at a price: your privacy. To get extensive cost-of-living and community reports on up to two cities, or a detailed comparison of up to three school districts, you must submit your name, street address, e-mail address, and phone number. Naturally, the site promises to share your personal information only with sponsors that can provide you with valuable services. But if you choose not to reveal this data anyway, well, that'll be $40, please, for the school report you requested (and $25 for each city report).

Once you've gotten your feet wet with the three big sites, you may want to drill down a little deeper for information on a specific topic such as schools. For $34, SchoolMatch (www.schoolmatch.com) will send information on test scores, district expenditures, and special programs, as well as statistical comparisons of any school in the United States, based on district and national averages. Reports tailored to your family's needs cost about $70.

Before you send off your credit card number, though, remember that school statistics change often—and just because you're paying for them doesn't mean they're current. SchoolMatch, for instance, claims that it constantly updates its information, but some of the data I found was about two years old.

Finally, when searching for the right community, check out town and school home pages. These sites may offer more insight into the character of a community than all the demographic facts in a database. And keep in mind that regard- ▶

hints for happy house-hunting

Speed Up Your Search
Real estate sites use lots of photos, graphics, and other resource-hungry extras. Without a 56-kbps modem or faster Internet access, you may end up spending more time reaching for the coffeepot than looking at houses. For serious shopping, conserve your nerves by investing in a fast modem. If you're really strapped for time, view listings as text only, and turn on the photos option only when you find a listing that interests you.

Beware the Cookie Monster
Real estate sites deliver more cookies than a Girl Scout in the springtime. If you're using a cookie notification feature, turn it off—or prepare for repetitive strain injuries to set in as you nuke all those cookies.

Get Prequalified for a Loan
It's fast, easy, and free—and it could save precious time and serious disappointment later, especially in a competitive housing market. So get a prequalification letter before you embark on a house hunt in earnest.

Protect Your Privacy
Though experts say getting a loan online is no riskier than getting one in a banker's office, be sure the loan site is secure by looking for the closed-lock icon. And use common sense: Don't leave your browser unattended, clear your cache often, and relaunch your browser when you are done with a transaction.

Go Local
Large listing sites such as Realtor.com are great for getting the big picture, but as you pinpoint your search, visit regional real estate sites as well. You can often link directly to their home pages from the individual listings on Realtor.com. Some of the smaller companies have beautifully designed sites that offer more photos and information than you'll find on the national sites. You might also get the edge on new listings, since these are usually posted on the companies' own sites first.

You want to e-mail.
He needs to download.
She'd like to surf.
Who will be left standing?

Compaq Awards

September 1998 **PC WORLD/FAMILY CIRCLE**
One of the 10 best PCs for home- or school-power systems • **PRESARIO 5630**

July/August 1998 **FAMILY PC**
Family PC Recommended Award • **PRESARIO 5600**

August/September 1998 **WINDOWS MAGAZINE**
WIN LIST • **PRESARIO 5600 SERIES**

June 1998 **BOOT MAGAZINE**
Kick-Ass Product • **PRESARIO 5600 SERIES**

	PRESARIO 5600i-500/3 INTERNET PC	**PRESARIO 5600i-500/3 INTERNET PC**
	Intel® Pentium® III Processor, 500 MHz	Intel Pentium III Processor, 500 MHz
	128 MB SyncDRAM expandable to 384 MB	128 MB SyncDRAM expandable to 384 MB
	16.8 GB UltraDMA Hard Drive[1]	13.0 GB UltraDMA Hard Drive[1]
	6X DVD-ROM Drive[5]	6X DVD-ROM Drive[5]
	Diamond Viper 550 AGP w/16 MB SDRAM	Diamond Viper 550 AGP w/16 MB SDRAM
	Diamond Monster Sound MX300 PCI Audio Card	Aureal 8820 PCI Audio Card
	6.0Mb Max Digital Modem[6]	6.0Mb Max Digital Modem[6]
	JBL Pro Premium Speakers w/Subwoofer	JBL Pro Premium Speakers w/Subwoofer
	Digital Creativity Imaging Center[3]	10 Mbps Ethernet Port, Cable Modem Ready[8]
	10 Mbps Ethernet Port, Cable Modem Ready[8]	MS Featured Home Collection & MS Word
	Home Phoneline Networking[7] (Integrated)	Microsoft Windows 98
	Microsoft® Featured Home Collection & MS® Word	Compaq V910 19" Monitor (18.0" VIA)
	Microsoft Windows®98	
	Compaq FP700 15" Flat Panel Monitor	
	$3199	**$2499**
Personalize with these options:	256 MB SyncDRAM: Add $300	19.2 GB UltraDMA Hard Drive:[1] Add $115
	Iomega® Zip Built-In™ Drive with 1 disk: Add $79	Home Phoneline Networking[7] for 2 computers:** Add $99
	22.0 GB UltraDMA High Performance Hard Drive:[1] Add $225	Tripp Lite Internet Office 700 UPS : Add $189.95

COMPAQ Better answers.℠

All prices shown are Compaq Direct selling price. Prices shown do not include applicable sales tax and shipping. Products and prices valid in the U.S. only. Actual retail price may vary. Specifications and prices are subject to change or cancellation without notice. Not all Compaq Presario models are available in all retail stores. *50 free hours of Internet Access is chosen from Compaq Internet Setup. The 50 free hours must be used over a 30-day period from initial setup. A valid credit card is required to initiate service, although no charges will be incurred until the 50-hour trial has expired. **Card for 2nd Computer requires open PCI Slot. [1]Each additional PC must have a network adapter, sold separately. [1]For hard drives, GB = billion bytes. [2]ITU V.90 modems are designed only to allow faster downloads from K56flex or V.90 compliant digital sources. Maximum achievable download transmission rates are currently unknown, may not reach 56 kilobits per second (Kbps), and will vary with line conditions. [3]Works with most third-party devices. [4]32X Max CD-ROM data transfer rates may vary from 1800 to 4800 KB/s. [5]The 6X DVD-ROM Drive transfer rate is up to 8115 KB/s compared to 1352 KB/s for 1X DVD-ROM Drives. [6]The 6.0Mb Max Digital Modem uses the ADSL/G.Lite protocol. ADSL/G.Lite updates may be downloaded from Compaq's Web site when available. The ADSL/G.Lite protocol is designed to allow faster downloads from ADSL/G.Lite compliant digital sources. Availability of ADSL/G.Lite services will vary by region and Internet Service Provider (ISP), and may differ from V.90 ISP services. Maximum achievable download transmission rates with ADSL/G.Lite are currently unknown, may not reach 6.0Mbps, and will vary with line conditions and distance. [7]Simultaneous use of a phone line for access and regular voice/fax usage may require a line splitter or filter under certain conditions. Installation of a line splitter is available at an additional cost and must be performed by your local telephone company. [8]Cable modem service availability and offering may vary by cable provider. Labor for desktop systems is pick-up service during the first 90 days of ownership. Compaq is not liable for editorial, pictorial, or typographical errors in this advertisement. Compaq, the Compaq logo, and Presario are registered in U.S. Patent and Trademark Office. Microsoft, MS, and Windows are registered trademarks of Microsoft Corporation. Intel, the Intel Inside logo, and Pentium are registered trademarks of Intel Corporation. Product and company names mentioned herein may be trademarks and/or registered trademarks of other companies. **Call Compaq Monday-Friday 7:00 am-11:00 pm (CST), Saturday and Sunday 7:00 am-7:00 pm (CST).** ©1999 Compaq Computer Corporation. All rights reserved.

intel inside pentium® III

Peace, harmony, and multiple Internet access. Signs of a happy household.

"It's my turn to go online." "No, it's my turn." "Is not!" "Is too!" Was this what the Internet promised? The people at Compaq don't think so. That's why we created these new Compaq Presario 5600 Internet PCs. They're the first computers with Home Phoneline Networking,[7] which lets you plug your family's PCs into your home's phone jacks. This allows everybody to surf the Net at the same time, on the same phone line.[†] So while dad e-mails his college roommate, the kids can visit their school's Web site. You can also share printers, files, and games. And there's more, like one-touch Internet access and 50 free hours on the Net.* Plus, these PCs are available with a 6.0Mb Max Digital Modem,[6] which works with your 56K dial-up access sources for incredibly fast access right away. As an added bonus, it lets you talk on the phone while you surf. And since it's ADSL and cable modem ready,[8] you can tap into those new high-speed technologies as soon as they come to your area. Of course, these PCs are loaded with tons of other great features, like Intel® Pentium® III processors, thrilling 3D graphics, DVD- or CD-ROM drives, and more — all at an incredible value. So now, your family can e-mail, download, and surf in a whole new way: peacefully.

PRESARIO 5600i-500/3 INTERNET PC

- Intel Pentium III Processor, 500 MHz
- 128 MB SyncDRAM expandable to 384 MB
- 13.0 GB UltraDMA Hard Drive[1]
- 6X DVD-ROM Drive[5]
- Diamond Viper 550 AGP w/16 MB SDRAM
- Aureal 8820 PCI Audio Card
- 56K ITU V.90 Modem[2]
- JBL Pro Speakers
- 10 Mbps Ethernet Port, Cable Modem Ready[8]
- MS Featured Home Collection & MS Word
- Microsoft Windows 98
- Compaq V720 17" Monitor (15.9" VIA)

$2199

- 16.8 GB UltraDMA Hard Drive:[1] Add $89
- 6.0Mb Max Digital Modem:[6] Add $99
- Compaq V910 19" Monitor (18.0" VIA): Add $170

PRESARIO 5600i-450/3 INTERNET PC

- Intel Pentium III Processor, 450 MHz
- 128 MB SyncDRAM expandable to 384 MB
- 13.0 GB UltraDMA Hard Drive[1]
- 32X Max CD-ROM Drive[4]
- 2X AGP Graphics w/8 MB SGRAM
- Aureal 8820 PCI Audio Card
- 56K ITU V.90 Modem[2]
- JBL Pro Speakers
- 10 Mbps Ethernet Port, Cable Modem Ready[8]
- Microsoft Office 97 Small Business Edition
- Microsoft Windows 98
- Digital Creativity Imaging Center[3]
- Compaq V720 17" Monitor (15.9" VIA)

$1999

- Diamond Viper 550 AGP w/16 MB SDRAM: Add $60
- 6.0Mb Max Digital Modem:[6] Add $99
- Iomega® Zip Built-In™ Drive with 1 disk: Add $79

PRESARIO 5600i-450/3 INTERNET PC

- Intel Pentium III Processor, 450 MHz
- 96 MB SyncDRAM expandable to 384 MB
- 13.0 GB UltraDMA Hard Drive[1]
- 32X Max CD-ROM Drive[4]
- 2X AGP Graphics w/8 MB SGRAM
- Aureal 8820 PCI Audio Card
- 56K ITU V.90 Modem[2]
- JBL Pro Speakers
- 10 Mbps Ethernet Port, Cable Modem Ready[8]
- MS Featured Home Collection & MS Word
- Microsoft Windows 98
- Digital Creativity Imaging Center[3]
- Compaq V720 17" Monitor (15.9" VIA)

$1899

- 128 MB SyncDRAM: Add $50
- 6X DVD-ROM Drive:[5] Add $59
- Diamond Monster Sound MX300 PCI Audio Card & JBL Pro Premium Speakers w/Subwoofer: Add $89

PRESARIO 5600i-400 INTERNET PC

- Intel Pentium II Processor, 400 MHz
- 64 MB SyncDRAM expandable to 384 MB
- 10.0 GB UltraDMA Hard Drive[1]
- 6X DVD-ROM Drive[5]
- 2X AGP Graphics w/8 MB SGRAM
- Aureal 8820 PCI Audio Card
- 56K ITU V.90 Modem[2]
- JBL Pro Speakers
- 10 Mbps Ethernet Port, Cable Modem Ready[8]
- MS Featured Home Collection & MS Word
- Microsoft Windows 98
- Compaq V720 17" Monitor (15.9" VIA)

$1599

- 128 MB SyncDRAM: Add $120
- Iomega Zip Built-In™ Drive with 1 disk: Add $79
- Home Phoneline Networking:[7] Add $49

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Moves fast, is incredibly thin, and has a fantastic memory. Remember when you were like that?

Compaq Awards

October 1998 **EQUIP MAGAZINE**
5 Star Rating and Best Overall Notebook Award • **PRESARIO 1650**

July/August 1998 **FAMILY PC**
Best Multimedia Notebook of the Year • **PRESARIO 1680**

April 1998 **LAPTOP BUYERS GUIDE & HANDBOOK**
BEST BUY Award • **PRESARIO 1621**

	PRESARIO 1900-366 INTERNET NOTEBOOK PC	**PRESARIO 1900-333 INTERNET NOTEBOOK PC**
	Intel® Pentium® II Processor, 366 MHz	Intel Pentium II Processor, 333 MHz
	13.3" TFT Active Matrix XGA Display	13.3" TFT Active Matrix XGA Display
	128 MB SyncDRAM expandable to 192 MB	96 MB SyncDRAM expandable to 192 MB
	10.0 GB UltraDMA Hard Drive[1]	6.4 GB UltraDMA Hard Drive[1]
	2nd-Generation DVD-ROM Drive[4]	2nd-Generation DVD-RDM Drive[4]
	256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM	256-bit AGP Accelerated 3D Graphics w/2.5 MB V
	56K ITU V.90 Modem[2]	56K ITU V.90 Modem[2]
	Smart Lilon Battery	Smart Lilon Battery
	256 KB Integrated "On-chip" cache	256 KB Integrated "Dn-chip" cache
	Microsoft® Dffice 97 Small Business Edition	MS® Featured Home Collection & Windows 98
	Microsoft Windows® 98	Folio Carrying Case
	$3699	**$2999**
Personalize with these options:	192 MB SyncDRAM: Add $150	10.0 GB UltraDMA Hard Drive:[1] Add $350
	Extra Smart Lilon Battery: Add $129	Extra Smart Lilon Battery: Add $129
	Port Replicator: Add $129	Tripp Lite Super Notebook Protector: Add $14.95

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intel inside pentium® II PROCESSOR

Hey, even the good old days were never this good. Because now you can have a movie theater on your lap. Your clients in the palm of your hand. And the world at your fingertips. All you need is the new Compaq Presario 1900 Internet Notebook PC. Amazingly, it's two computers in one. A fully loaded next-generation notebook. And one of the lightest, sleekest computers you've ever tucked under your arm. How did we manage to create both? A revolutionary new feature: the removable drive wedge.

Have it all without carrying it all.

We created a precision-engineered wedge that contains a DVD-ROM, floppy drive, and port replicator connector. With the wedge on, you've got the ultimate, all-in-one multimedia notebook. Snap off the wedge and you've got a lean, mean, 1.2-inch-thick notebook that weighs in at only 5 lbs. (Which is a good thing when you're sprinting for a plane.) Either way, you'll have a notebook with one-touch Internet access, outrageous graphics, a high-speed modem, and a large, vibrant screen. It's everything you could wish for.

PRESARIO 1900-300 INTERNET NOTEBOOK PC

Intel Pentium II Processor, 300 MHz
13.3" TFT Active Matrix XGA Display
64 MB SyncDRAM expandable to 192 MB
6.4 GB UltraDMA Hard Drive[1]
2nd-Generation DVD-ROM Drive[4]
256-bit AGP Accelerated 3D Graphics w/2.5 MB VRAM
56K ITU V.90 Modem[2]
Smart Lilon Battery
256 KB Integrated "On-chip" cache
Microsoft Featured Home Collection
Microsoft Windows 98

$2749

Port Replicator: Add $129
Extra Smart Lilon Battery: Add $129
Extra AC Adapter: Add $49

PRESARIO 1600i-366 INTERNET NOTEBOOK PC

Intel Pentium II Processor, 366 MHz
14.1" TFT Active Matrix XGA Display
96 MB SyncDRAM expandable to 192 MB
6.4 GB UltraDMA Hard Drive[1]
24X Max CD-ROM Drive[3]
256-bit Accelerated 3D Graphics w/2.5 MB VRAM
56K ITU V.90 Modem[2]
Smart Lilon Battery
256 KB Integrated "On-chip" cache
Microsoft Office 97 Small Business Edition
Microsoft Windows 98

$2999

192 MB SyncDRAM: Add $250
2nd-Generation DVD-ROM Drive:[4] Add $149
Port Replicator: Add $129

PRESARIO 1600i-333 INTERNET NOTEBOOK PC

Intel Pentium II Processor, 333 MHz
14.1" TFT Active Matrix XGA Display
64 MB SyncDRAM expandable to 192 MB
6.4 GB UltraDMA Hard Drive[1]
2nd-Generation DVD-ROM Drive[4]
256-bit Accelerated 3D Graphics w/2.5 MB VRAM
56K ITU V.90 Modem[2]
Smart Lilon Battery
256 KB Integrated "On-chip" cache
Microsoft Office 97 Small Business Edition
Microsoft Windows 98

$2849

128 MB SyncDRAM: Add $200
Tripp Lite 140 Watt Inverter: Add $49.95
Port Replicator: Add $129

PRESARIO 1600i-300 INTERNET NOTEBOOK PC

Intel Pentium II Processor, 300 MHz
14.1" TFT Active Matrix XGA Display
64 MB SyncDRAM expandable to 128 MB
4.3 GB UltraDMA Hard Drive[1]
2nd-Generation DVD-ROM Drive[4]
256-bit Accelerated 3D Graphics w/2.5 MB VRAM
56K ITU V.90 Modem[2]
Smart Lilon Battery
256 KB Integrated "On-chip" cache
MS Featured Home Collection & Windows 98
Folio Carrying Case

$2499

6.4 GB UltraDMA Hard Drive:[1] Add $100
Extra Smart Lilon Battery: Add $129
Xircom 10/100 Ethernet PC Card: Add $169

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less of how many online resources you find, there's only so much the Web can tell you. The best way to evaluate a neighborhood is to visit it yourself and talk to the people who live there.

Step 4: Find Your Dream House

NOW THAT A FEW mouse clicks are all that stand between you and years of staggering debt, you're ready for the fun part: finding that beach house!

For sheer quantity of listings, the hands-down winner on the Web is Realtor.com. The site, designed for real estate professionals and consumers, carried more than 1.3 million listings at press time—that's about 95 percent of all homes for sale in the United States. It draws listings directly from the Multiple Listing Service, a national database to which most real estate agents subscribe.

To start shopping, select a state and town and answer a few questions to narrow down the results. General search criteria include type of home, price range, number of bedrooms and bathrooms, and minimum square footage. If you know exactly what you want and don't want to browse through multiple listings, complete the optional search criteria. Here you can request specific features like central air, a two-car garage, and a water view.

The resulting list gives each home's location and price. Many entries also include a photograph and more details about the property. Click the photo or the *More Information* button for room dimensions, appliances, tax rates, community amenities, and unique features. Each entry also lists an estimated monthly mortgage rate (based on current interest rates and a 20 percent down payment), a link to neighborhood information, and contact information for the listing office.

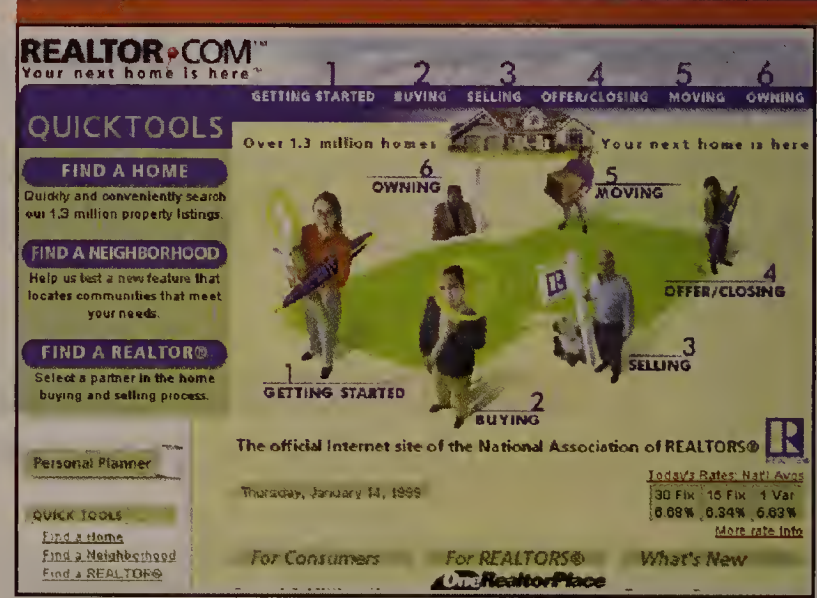
If your search turns up properties you'd like to revisit later, save them to your Personal Planner. Once you register a profile, you'll get an e-mail message whenever a house that matches your criteria hits the market. At press time, the site updated daily the listings for 30 metropolitan areas.

Supplement your search on Realtor.com with a side trip to HomeScout (www.homescout.com). With over 750,000 listings from across the United States, HomeScout is less comprehensive than Realtor.com. But it includes some non-MLS properties, and its straightforward design makes it very easy to use. The home page is split into two sections: Shop loans (which takes you directly to the HomeShark home page) and Shop homes.

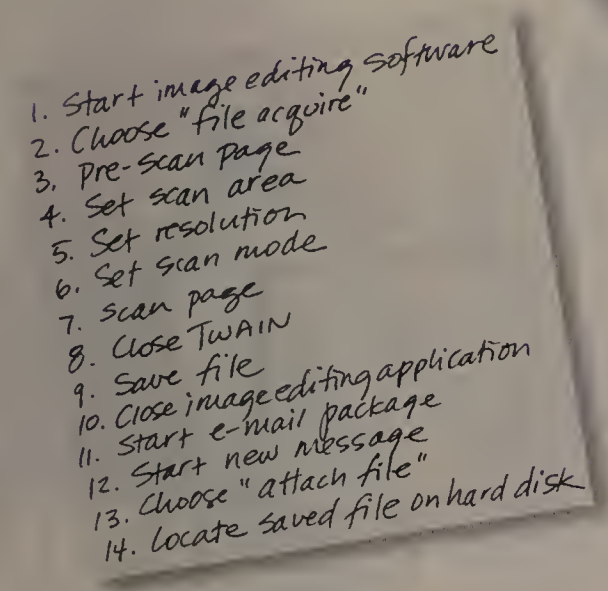
To browse the listings, choose a state, a city, a property type, and a maximum price; then hit *Search*. HomeScout will gather all suitable listings and display each match, citing the price, the location, the number of bedrooms and bathrooms, the online listing source, and real estate agent contact information.

You can sort the results in ascending or descending order by price, or by most recent listing date. Click the appropriate link to find out more information and to view a photo of a property—or to get a list of available loans, including interest rates, closing costs, and monthly payments. Here, too, you can save your searches in a personal profile and register for weekly e-mail updates. One caveat: Because HomeScout's listings come from individual source sites, the site is updated sporadically, which means that your search may dig up properties that are no longer available.

If you already know precisely where you want to live, visit CyberHomes (www.cyberhomes.com), which features unique map interfaces with its listings. Let's say that you want to be able to walk to work. Choose the *Radius Search* feature; then enter the address of your office, the number of miles you are willing to walk, your price range, and the type of house you're looking for. CyberHomes will call up a list of available properties, with details ▶



TOP: HomeScout's home page design makes it one of the easiest real estate sites to use. **MIDDLE:** Seattle anyone? Microsoft's HomeAdvisor is thorough in every area but listings. **BOTTOM:** Find a home at Realtor.com, tops in listings with 1.3 million.



How to scan and e-mail a photo from their scanner.

How to do it from ours.

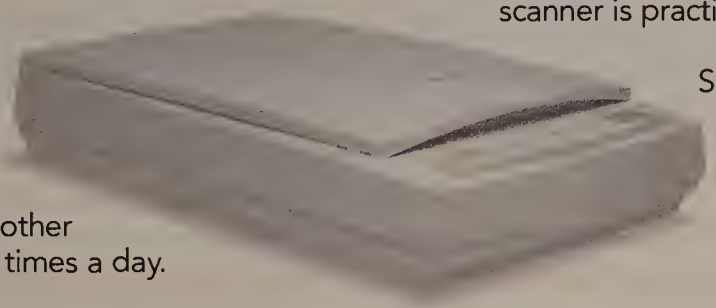
One small step for scanners. 13 fewer steps for you.

Let's face it, most scanners are not as simple as they are supposed to be.

Drag and drop, plug and play, billions of colors, and all the other terms and specs don't make a bit of difference when all you want to do is e-mail a photo, scan a page of text into your word-processor or any of the other tasks you do countless times a day.

Visioneer OneTouch offers a simpler, more elegant solution. It does most of the work for you, thanks to its tight integration with the PaperPort software.

Drop in your original. Push a button. It's that easy. Hold down a button, change a few settings, and your scanner is practically a whole new machine.



Sure, we have all the specs and features you expect in a quality scanner, but we think you'll be much more impressed with those five friendly buttons up front.

Visioneer OneTouch.
All scanners should be this simple.

Buy an HP CD-Writer 7200i or 8110i and Visioneer OneTouch 5300 scanner and get $129.00 cash back!**

visioneer. ONETOUCH 5300 SCANNER
300x600 dpi optical resolution
36-bit color (internal)
$99 after mail-in rebate*

visioneer. ONETOUCH 7600 SCANNER
600x1200 dpi optical resolution
36-bit color (internal)
$149.99

• Printer port pass-through design • Lift-off lid • Includes PaperPort software
• Windows 95/98/NT 4.0 compatible

visioneer

PC Computing THE A LIST
Visioneer OneTouch 5300 Scanner

Visit our website at pcw.visioneer.com

*Estimated U.S. street price after $30 mail-in rebate. Rebate valid in the U.S. and Canada at participating resellers. © 1999 Visioneer, Inc.
**$30 mail-in rebate with purchase of a OneTouch 5300 or $129 rebate with purchase of a OneTouch 5300 and an HP CD-Writer (model 7200i or 8110i).
Circle 255 on card or go to www.pcworld.com/productinfo

such as price, number of bedrooms and baths, year built, agent contact information, and tax rate. Most of the listings also include photographs, as well as links to mortgage calculators and to school and community information (although the data I found was sparse for many areas, and often out of date).

If you want to search the traditional way, CyberHomes also locates properties by feature, address, or MLS number. You can view results as a list or a map of icons. Click an icon for details. CyberHomes allows you to save searches and to sign up for e-mail notification of new listings. The site is updated daily.

Unfortunately, CyberHomes does not include listings for every part of the country. At press time it had 600,000 listings ranging across much of the United States but failed to cover a number of states and metropolitan areas.

Still haven't seen enough yet? HomeSeekers.com (www.homeseekers.com) maintains over 650,000 listings, updated daily, covering much of the United States and Mexico. Not all of these listings include photographs, but you can map their locations and get basic information. The site also has an accessible mortgage calculator and links to basic community and financial information. You can search HomeSeekers.com for new homes, resorts, and foreclosed properties, too.

Step 5: Find an Agent

HOUSE SHOPPING in your pajamas may be the ultimate in convenience, but let's face it: The virtual world has its limits. Once you've scoured the real estate sites and followed every e-mail lead beamed your way, you'll want to close the windows on your browser and open a few real ones. Maybe you'd like to discuss the neighborhood with someone who lives there or chat with one of the teachers at the local elementary school. It may be time to find a good local real estate agent.

This is where the real estate sites' seemingly free information starts to pay off for them. They've lured you toward those dream houses; now it's time for them to reel you in and sell you one. Realtor.com's Find a Realtor link, for instance, provides one of the most comprehensive lists of real estate offices on the Web.

Often you'll find links to individuals' résumés and home pages. Gather as much information as you can from these sites, and make a list of agents to interview. When you're ready to pick up the phone, Microsoft HomeAdvisor can help you compile a batch of interview questions designed to find the right real estate agent for you. Fire off some questions via e-mail to make sure they're responsive. Many agents have e-mail accounts and don't even know it, so make sure you hook up with one who's prepared to use the PC to your advantage.

Using your computer and the Web, you have found a neighborhood, a loan, some houses to check out, and an agent. Now you must leave the relative safety of your study and bag that dream home on the beach. One more thing: If you ever decide to sell it, send me an e-mail.

Anne Kandra is the assistant managing editor at PC World. ■

be your own agent

NO DOUBT ABOUT IT: Whether the task is finding a house or getting a loan, the Web gives you the tools to do it yourself. But are you brave enough to buy or sell a house without involving an agent? If so, check out Owners.com (www.owners.com), a one-stop home-shopping site that lists 35,000 properties in all 50 states.

FREEDOM FORUM

"HISTORICALLY, home sellers who didn't want to use a Realtor had one option: a classified ad in the newspaper," says Hans Koch, CEO of Owners.com. "We wanted to provide an online forum for sellers to market their property. Our vision is to meld technology and consumer acceptance and enable the entire home buying process to occur online."

To add a listing, sellers fill out an online form providing their name, phone number, and information about the property being sold. Sellers can post an unlimited amount of text and one photograph for free; additional pictures or enhancements cost extra. The listing stays online until the seller deletes it, and it can be updated or edited at any time. "People like the option of selling their homes themselves," Koch explains, "because they can save the broker's fee and apply that toward things like home improvements to help leverage the sale."

HAVE IT YOUR WAY

FOR BUYERS, Owners.com is a fresh source of listings and relocation information. The site's advisers will help guide buyers and sellers through the transaction, but this option is probably not for everyone.

"Consumers still turn to brokers because real estate is not a commodity. All pieces of real estate and all transactions are unique," explains Peter Miller, an author who developed Ourbroker.com, an online source of real estate information for consumers. "Every form or piece of information you get on the Internet should be checked by a broker or an attorney."

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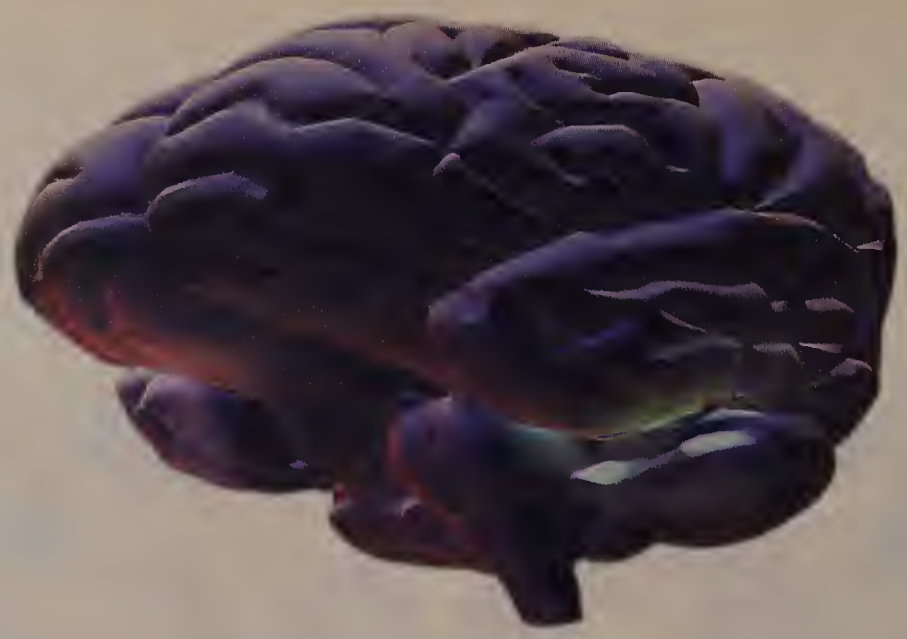

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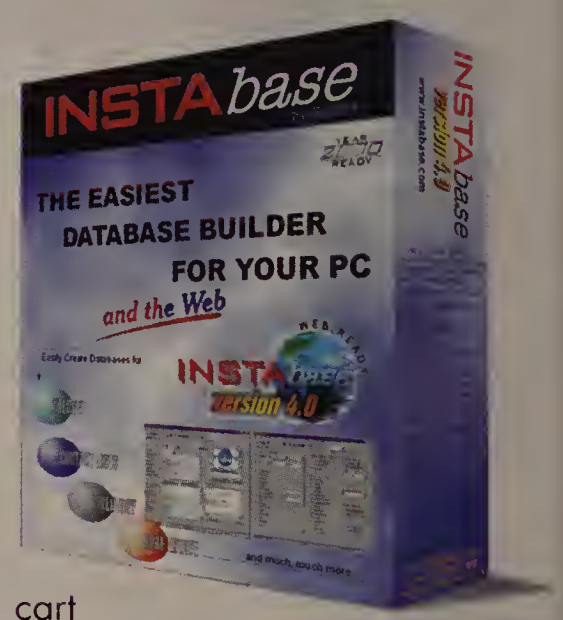

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STOREFRONTS & SHOWROOMS IN CYBER SPACE

PART ONE

A practical guide for small business and the Web, whether you are selling or just strutting your stuff

C-Systems' Barry Wadman

WOULD YOU INVEST TIME AND MONEY building a beautiful storefront, and then place it in the middle of dense, uninhabited woods? Painstakingly put together a showroom with top-of-the-line fixtures, and then leave it empty of any merchandise? Design a store where the customers had to climb a flight of stairs every time they needed product information?

Of course not. Yet that's essentially what many businesses do when they neglect to consider content, promotion, and usability of their Web sites. Even though online business trade is soaring (Forrester Research in Cambridge, Mass., predicts online business will be valued at $1.3 trillion in 2003),

STOREFRONTS & SHOWROOMS IN CYBERSPACE

customer satisfaction is dropping. A joint study by Jupiter Communications in New York and NFO Interactive in Greenwich, Conn., found that online customer satisfaction fell 14% during the 1998 holiday season, compared to a similar study conducted in July 1998. And a Forrester Research study, titled "Why Most Web Sites Fail," found that 10% of *Fortune* 1,000 Web sites needed "drastic action" to address problems with content, reliability, and function.

This doesn't mean businesses should shy away from developing a Web site. "The Internet enables a new universe of services previously available only to corporations," says Mahesh Veerina, president and CEO of Santa Clara, Calif.-based Ramp Networks. "High-speed Internet access will make business practices like supply-chain management and customer collaboration even more accessible for small businesses."

"Anyone doing business should have a Web site, because the Internet is such an incredible vehicle," says Barry Wadman, founder and president of C-Systems Inc., a Web site developer in Concord, Mass. *(www.c-systems.com)*. The key, he says, is knowing how to use the Internet to best advantage.

KNOW THE AUDIENCE The most common mistake businesses make is not considering whom they want to use the Web site, Wadman says. "They need to find out who and where that audience is," he explains. Harley Manning, a senior analyst at Forrester Research and a co-author of the "Why Most Web Sites Fail" study, echoes that advice. In addition to asking who the audience is, he suggests companies also ask, "What are the goals of the audience? What tasks do they need to accomplish these goals?" Says Manning: "Concise answers to these questions will serve as a compass to keep you on track."

Manning cites Microsoft's CarPoint as a good example of a Web site that addresses these questions. "They know that some people already know what kind of car they want, so there's a search button to help them find those cars fast." He points out that other customers who are just browsing can use decision-support tools to identify cars that fit their specific needs. There's even a payment calculator to help people determine how much they can afford to spend on a car.

> "You can have a great Web site, but if no one knows about it, it's like a neon sign on a country road."
> —Garner Bornstein, Generation Net

EVALUATE THE EXPERIENCE Businesses should also evaluate how easy the Web site is to use, Manning says. Is the type large enough to be legible? Do fancy graphics add to the download time of each frame? A common problem of most sites, Manning says, is too many levels. According to "Why Most Web Sites Fail," poorly designed sites are underselling by as much as 50%. If a product is placed on the third layer of the site instead of the second, customers will succeed at finding the product only half as often. Each additional layer of menus reduces success, and sales, by one-quarter to one-half. "Some Web sites bury important information on the fifth or sixth levels," Manning says. "In these cas-

Generation Net

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STOREFRONTS & SHOWROOMS IN CYBERSPACE

es what's remarkable is not that these sites have low levels of usage, but that they have ANY usage." Since some layering is inevitable, Manning's advice is "go back to the key audience questions and prioritize."

One way to enhance the user's experience is through personalization. Garner Bornstein, president of Generation Net, a Web site developer in Montreal, says, "We always design for the second visit. One way we do this is by having the customer fill out a profile so we can offer better service the next time they visit the site." For instance, if a customer indicates that he prefers a certain clothing designer, the site can alert him to special previews or sales of the designer's merchandise. "Take advantage of the computer medium and be interactive with the customer," advises Manning. "If the customer has to fill out information time and time again, you're practically begging them *not* to come back."

OFFER SOMETHING USEFUL Manning says it's also critical to do something useful for the site visitor. Many Web sites have beautiful graphics, but no content. "It's similar to having an eye-catching store window with no merchandise, or a library with beautiful bookcases and furniture but few books," Manning says.

Bornstein says one of the first things he tells clients is this: "Don't try to do a hard sell on the Web site." Instead, he advises clients to use the site to provide information and service. As an example he points to the Web site of his client Kitchen & Company, based in Reading, Penn. The audience for the Web site includes brides and grooms, so the site offers information that might be of interest to someone setting up a household for the first time. "The goal is to establish a relationship with customers so they keep coming back," Bornstein explains. "If someone provides you with helpful information, you are more likely to purchase something from them."

Online customers who find helpful information on a Web site are also less likely to be cost-conscious. *The Wall Street Journal* cited research conducted by Penn State's Smeal College of Business Administration professor Arvind Rangaswamy on Marriott International's online reservation service, which found that travelers' price sensitivity decreased when the Web site contained "a rich variety of information and was highly interactive." In the case of Marriott, the site contained information on the location and nearby activities.

PROMOTE THE SITE Bornstein says another huge mistake companies make is not promoting their Web site enough. "You can have a great Web site, but if no one knows about it, it's like a neon sign on a country road," he says. "Before the Internet, you were competing in your own backyard. Now you are competing with hundreds of companies around the world."

Wadman recommends that the marketing budget be three times the cost of building the Web site, and that the promotion go beyond search engines. "For every 100 people who see an ad on the Internet, only three people will click through," he explains. "The Web site should be promoted on all corporate communications: letterhead, billboards, advertising."

CONSIDER PARTNERSHIPS Web site partnering is another effective way to market a site, according to Wadman, who predicts that "partnering on the Internet will make or break a company." An example of an Internet partnership might be a jeweler with a hyperlink to a florist, since both companies specialize in romance. Wadman's latest project is an Internet shopping mall for Minneapolis-based GiftsIntl.com Inc. The mall will feature about 25 noncompeting retailers and will be marketed to companies that offer gift recognition and loyalty programs. For instance, if someone has earned "frequent buyer points" on a participating credit card, they can go to this Internet mall to "spend" their points. David Upin, founder and CEO of GiftsIntl.com, says, "Retailers benefit because the customers already have 'money' to spend. The management of the loyalty points program benefits because they don't have to produce catalogs and manage inventory of the gifts."

A Web site can be a very valuable marketing tool. David Kaster, a partner at Boston-based Seidlers Jewelry, has a site that averages 12,000 hits per day. "Our goal is not to sell engagement rings over the Internet, since jewelry is something people like to see and touch," Kaster explains. "Instead, we use the Web site to reinforce the impression of quality and integrity. If people want to review a jewelry piece they saw in our store they can revisit it on our Web site. It really is an effective way to reach customers and enhance business."

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THE NUTS AND BOLTS OF OPERATING A WEB SITE

Even the most beautifully designed Web site is ineffective if it is malfunctioning. That's why Barry Wadman, founder and president of Web developer C-Systems Inc. in Concord, Mass., advises businesses to consider the following operational functions when constructing a Web site:

SITE UPDATES AND IMPROVEMENTS: Web sites are works in progress, so improving and updating the site regularly is key, Wadman says. "What brings people back to your site are new things," he explains. "After all, you wouldn't keep returning to a store if it always had the same merchandise."

Barry Wadman

PETER SMITH

When making improvements, it's important to listen to customer feedback to determine what does and doesn't work. Sometimes customers find certain things on a site too cumbersome, "so we ditch them," he says. He cautions, however, that while change is good, "if the site is working the way it is, don't touch it."

Updating the site to add new inventory or information is also important. To make updates easier, Wadman recommends using a database-driven system. "This allows business managers to use a template to update the sites themselves, instead of using the Web developer," he explains. When doing updates, Wadman cautions, "if you change the code, make sure everything is still working. And never do development on a run-time site!"

24/7 RELIABILITY: To ensure reliability, Wadman insists all of his clients run their Web sites on more than one server. "If you run on only one server and that server blows up, you're dead in the water," he explains. "Which is worse, spending more money up front for a fault-tolerant system, or losing hours and hours of potential revenue when your single server goes down?"

SITE SECURITY: Wadman says security is often ignored because of the cost. "But there's always some hacker looking to break into your system," he states, which is why he recommends all sites have firewalls.

E-MAIL RESPONSIVENESS: Like unreturned phone calls, unanswered E-mails leave a negative impression with customers. And unlike phone calls, E-mails leave a paper trail, which Wadman points out, "can hang you in the end." He suggests using an E-mail management system, which can route an E-mail to the proper department (such as sales or technical support) and automatically send the customer a response. The response may be a standard reply for that department (such as advising customers how to return items), but the customer is given the option of sending an additional E-mail for a more personal response if more information is needed.

BUILT-IN SUCCESS: "When you go to a mall you don't expect to find the doors closed because of an electrical malfunction," Wadman says. "That's why malls have back-up generators." Taking similar steps to keep a Web site up and running is just as important. As Wadman points out, "a successful Web site must act and look successful." With the proper nuts and bolts, it will. ✪

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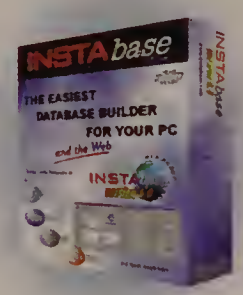

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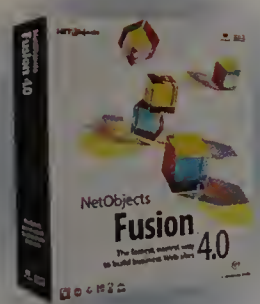

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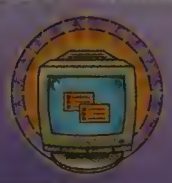
251 Monitors



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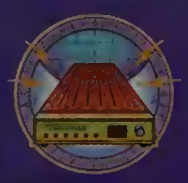

Pentium III A Star Is Born

BIG FOUR: New 500-MHz PIII systems made by (clockwise from upper left) Dell, CompUSA, Gateway, and Micron.

Edited by Cameron Heffernan

SEQUELS SELL. Why else would we have had *Rocky V, 60 Minutes II,* and John Glenn back in space? So it's not terribly surprising that Intel gave its newest processor the rather unimaginative name Pentium III. No need to get clever when *Pentium* is as well-known to consumers as *Kleenex* and *Jell-O.* (Hmmm, Kleenex II? Jell-O 2000?) Fortunately for power PC users, Intel puts more creative effort into designing faster chips than into naming its babies. The new 450- and 500-MHz Pentium III chips are faster than their Pentium II predecessors, of course. But are they a better value?

For this month's *Top 100* and *Top of the News* (see "Pentium III Hits 500 MHz!!!" page 48), we looked at six systems fitted with the new Pentium III processor. What struck us first was the high price: $2877 on average for a PIII-500 system, $2650 for a PIII-450. By contrast, the median PII-450 price on this month's Top 20 Power Desktops chart is $2392. So it's a bit surprising that the Pentium III PCs did well enough to make our chart despite their higher cost. In fact, three earned Best Buys.

Though all six PIII-based PCs posted scores high enough to rank in the Top 20, only four appear on this month's chart. That's because two of the six we tested—the Gateway E-4200 450 and the Micron Millennia 450 Max—are so nearly identical to their 500-MHz siblings, it would be redundant to give each a separate chart ranking. The only difference beyond CPU speed: The Micron Millennia 450 Max ships with a 14.4GB hard disk versus a 22GB monster for the Millennia 500 Max.

Speed is a crucial component in the success of the four 500-MHz Pentium III systems we looked at (from CompUSA, Dell, Gateway, and Micron). Among this month's Top 20 Power systems, a typical Pentium II-450–based PC running Windows 98 scored 215 on our PC WorldBench 98 test. The PIII-500 systems averaged 234, a healthy performance boost of about 9 percent. For their part, the Gateway and Micron Pentium III-450 systems both garnered PC WorldBench 98 scores of roughly 219, which amounts to a rather negligible performance advantage over Pentium II-450 machines.

Given the relatively minor speedup in performance, why should you consider one of the PIII-450 systems over a PII-450 PC? The two Pentium III PCs we reviewed have a significant advantage in features: massive hard drives, large monitors, and (in one case) the latest DVD-ROM drive. Excellent features aren't to be found only in the 450-MHz PIII systems, naturally. Three of the PIII-500 systems we looked at have *22GB* hard disks. (Just trying to back up your data from a hard drive that big can be a problem.) The Micron Millennia 500 Max carries the latest 6X DVD-ROM drive, and three of the four PIII-500 PCs have 19-inch monitors. So if the price seems to be getting out of reach, you can substitute less-expensive components.

SPEED OR PRICE?

THE TWO PCS EQUIPPED with the 450-MHz PIII processor cost roughly $200 less than their 500-MHz siblings. In terms of performance, the Micron Millennia 500 Max ran the PC WorldBench 98 test 8 percent faster than the 450 Max, while the Gateway E-4200 500 was 7 percent faster than the E-4200 450. So from a price-for-performance perspective, the internecine competition ends in a draw. It's up to you to decide whether the modest speed gain justifies the extra price.

If you simply must have the fastest PC available, the Pentium III-500 systems bring a lot to the desktop. The Best Buy

The new Pentium III 500-MHz–based systems are expensive,

YOUR GUIDE TO THE TOP 100

QUESTIONS ABOUT OUR CHARTS? The following section should answer most of them.

How do the charts work? The Top 20 and Top 10 charts are evolving lists of the best PCs, printers, monitors, graphics boards, and modems we've tested. System charts are divided by price. Power desktops cost $2000 or more; power notebooks cost $2750 or more. We compare new products to previously reviewed hardware, updating the charts to reflect price cuts and other changes.

Where do you get your prices? We estimate street prices based on vendor information and our own research, including surveys of retail outlets. We recheck all prices every month.

What does the overall rating mean? This 100-point scale reflects results from our hands-on evaluations and performance tests. A score in the 90s is exceptional, while one in the 80s is among the best and one in the 70s above average.

What does the PC WorldBench 98 score mean? It's a measure of how fast a PC is in relation to our baseline machine, a Gateway PMMX-200 configured with 32MB of RAM, a 2GB hard drive, and 512KB of secondary cache. A PC that scores 200, for instance, is twice as fast as the baseline system.

Where do the scores for reliability, support quality, and support policies come from? Reliability and support quality scores are based on surveys of *PC World* readers and anonymous support calls made by *PC World* staff. The policies score is based on vendor support policies.

What do all those word scores mean? Word scores for performance and price are based on a product's rating in relation to other products in its category. For instance, we score the performance of Windows NT PCs separately from that of Windows 95 machines. (Based on our PC WorldBench 98 tests, Windows NT machines are faster on average than Win 95 PCs.)

Check out *PC World's* Top 400 reviews online. Point your browser to PC World Online (www.pcworld.com/top400) to explore our Top 400, which provides comprehensive reviews and ratings for products in 16 different categories. You'll also find reviews not available in print.

BUDGET SOHO: At $1499, CyberMax's feature-rich Enthusiast KII-400R won't break the bank.

but they're also equipped with impressive high-end features.

Micron, Gateway, and Dell PCs registered very similar scores, and they're all solid systems from large, established, direct-to-end-user vendors. Which one to pick depends on your priorities: The two Gateway E-4200 systems are the only standard-configured corporate systems. For example, they ship with network cards and remote management features, while offering more expansion room than either the Micron Millennia 500 Max or the Dell Dimension XPS T500. On the other hand, in our most recent survey, Gateway earned only a fair rating for the quality of its support, a category where Dell and Micron earned higher marks.

A little farther down the chart sits the $2892 CompUSA American Pro 500. It performs a tad slower than the other three PIII-500s, lacks a hard-copy system manual–though you do get on-screen versions of system documentation–and falls short of the other vendors in the support category. Nonetheless, this solid business machine will keep you ahead of the obsolescence curve for a while.

BEYOND PENTIUM

THE PENTIUM III isn't the only processor debuting this month. We also got our first peek at four budget PCs equipped with the new Celeron-366 processor and three with the new AMD K6-2-400. The standout is CyberMax's $1499 Enthusiast KII-400R. Equipped with AMD's K6-2-400 processor, this PC from CyberMax's small-office line performs well for a budget system (a PC WorldBench 98 score of 187) and delivers a strong set of features: a 19-inch monitor, a 4.8X DVD-ROM drive, a Zip drive, and an integrated network card.

MORE NEW CHIPS

NOTEBOOK USERS need not feel neglected by this month's bonanza of systems bearing new processors. To address their needs, Intel has released six new chips specifically designed for corporate and consumer portables—and the systems we examined that came equipped with the new technology fared extremely well on both the power and the budget sections of this month's Top 10 Notebook PCs chart.

Part of the reason the new chips run faster is that, unlike on standard Pentium chips, the secondary cache is incorporated within the processor die. We tested five notebooks equipped with one or another of these new processors. The $3134 Gateway Solo 5150LS, which led the way among power systems, has a mobile PII-366 CPU, a 14.1-inch screen, and a PC WorldBench 98 score of 186. On the budget side, we preferred the $2229 Dell Inspiron 3500 C300XT, with its mobile Celeron-300 CPU.

NEW NAMES, SAME BOXES

NEC HAS INFORMED US that it will be changing the name of its Direction line to PowerMate VT, effective early in the second quarter of this year. A company spokesperson said that the new line will target the same small-office/home office market as the Direction series did. The older PowerMate ES line will remain unchanged, continuing to focus on the larger corporate market.

Cameron Heffernan is an associate editor for PC World. *Senior Associate Editors Vince Bielski, Bryan Hastings, and Karen Silver; Staff Editors Grace Aquino and Mick Lockey; Editorial Assistant Kalai Murugesan; and freelance writers Gordon Meyer and JoAnne Robb contributed to the Top 100. Testing was performed by Ulrike Diehlmann, Robert James, Elliott Kirschling, Jeff Kuta, Nancy Miller, and Mike Salayko of the PC World Test Center. See page 14 for contact information.* ▶

POWER TO GO: Gateway's Solo 5150LS sports the new PII-366.

PC WORLD

TOP 20 POWER DESKTOPS

	SYSTEM	Last month	Month tested	Street price (1/15/99)	CPU	Comments
1	Dell OptiPlex GX1p 450 800/388-8542 www.dell.com	1	Mar 99	$2449	Pentium II-450	$50 off corporate system with speed, management features, and 14.4GB hard disk.
2	Micron Millennia 500 Max 888/634-8799 www.micronpc.com	n/a	NEW	$2899	Pentium III-500	Fast, loaded; the PIII-450-based Millennia 450 Max is also a good value at $2599.
3	Gateway E-4200 500 800/315-2536 www.gateway.com	n/a	NEW	$2899	Pentium III-500	Corporation-friendly PC features terrific speed and manageability.
4	Dell Dimension XPS T500 800/388-8542 www.dell.com	n/a	NEW	$2816	Pentium III-500	Quick new SOHO entry has Zip and 4.8X DVD-ROM drives; only a 17-inch monitor.
5	Quantex QP6/450 SB-4 800/896-4898 www.quantex.com	16	Mar 99	$2299	Pentium II-450	Small-business system gets $250 cut; strong performance on NT, network card.
6	MidWest Micro WKP-450 800/728-8582 www.mwmicro.com	n/a	NEW	$2499	Pentium II-450	Corporate PC packed with 19-inch monitor, LS-120 drive, and network card.
7	Dell Dimension XPS R450 800/388-8542 www.dell.com	2	Nov 98	$2245	Pentium II-450	Now ships with 12GB hard disk, STB NVidia 3D graphics card with 16MB of RAM.
8	Gateway E-4200 450 800/315-2536 www.gateway.com	8	Feb 99	$2429	Pentium II-450	Managed PC with strong warranty and network card is slow for a PII-450 PC.
9	Quantex QP6/450 SM-4x 800/896-4898 www.quantex.com	19	Feb 99	$2399	Pentium II-450	Multimedia system drops $70 from price; ships with useful business software.
10	IDot.com Entrepreneur 4 888/388-4368 www.idot.com	n/a	NEW	$2499	Pentium II-450	New small-business system offers Zip and 4.8X DVD-ROM drives, limited expansion.
11	CompUSA American Pro 500 888/226-6772 www.compusa.com	n/a	NEW	$2892	Pentium III-500	Good sound and a 19-inch monitor grace this quick new small-biz PC.
12	NEC PowerMate 8100 888/863-2669 www.neccomputers.com	20	Jan 99	$2658	Pentium II-450	$330 off corporate PC with network card and USB monitor but no software bundle.
13	Axis Systems Metropolis GX7-S PII-400 800/378-9014 www.axissys.com	7	Mar 99	$2788	Pentium II-400	Managed corporate PC with network card has great performance, good features.
14	Acma ZPower 7450 PII-450 800/786-6888 www.acma.com	13	Mar 99	$2598	Pentium II-450	Quick PC with network card, DVD-ROM and Zip drives, limited expandability.
15	IBM PC 300 PL 800/426-2968 www.ibm.com	15	Jan 99	$2269	Pentium II-450	$280 off quick network-ready desktop; retail only; to order, use model #6862fxj.
16	Sys Performance Pro 450 800/613-9963 www.sys.com	6	Dec 98	$2399	Pentium II-450	Well-stocked general-business PC with LS-120 drive.
17	Axis Systems Orion 100V DVD 450 800/378-9014 www.axissys.com	n/a	NEW	$2299	Pentium II-450	New system from Axis's multimedia line comes with 4.8X DVD-ROM drive, Zip drive.
18	HP Brio 8500 PII-450 800/752-0900 www.hp.com/desktops	18	Dec 98	$2318	Pentium II-450	High performance small-business PC has network card and CD-RW drive.
19	Compaq Deskpro EP 6450 800/345-1518 www.compaq.com	9	Nov 98	$2148	Pentium II-450	Corporate computer with Zip drive is cheap for a Pentium II-450.
20	HP Vectra VL Series 8 HE 800/322-4772 www.hp.com/desktops	14	Nov 98	$2370	Pentium II-450	High-end corporate PC with plenty of management options is multimedia-savvy.

Best Buy See features chart, page 222; test report, page 224.

n/a = not applicable

[1]A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100" on page 218.

[2]For more information about all products in this table, select product info number 904 or visit www.pcworld.com/productinfo.

WE GOT OUR HANDS ON SIX NEW POWER SYSTEMS—from four manufacturers—equipped with Intel's brand-spanking-new Pentium III processor. All of them qualified to make this month's chart, and none would have ranked below 11th place. (Those from the same manufacturer that had virtually identical configurations didn't receive separate spots on the chart, however; see individual capsule reviews for details.) Micron's number two finisher, the Millennia 500 Max, leads the PIII-500 pack, but it differs only slightly from the 500-MHz entries provided by Gateway and Dell, which also earn Best Buys. The Millennia Max does, however, flaunt the first 6X DVD-ROM drive we've seen on the Top 20 chart.

SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Performance [1]	Features and design	Vendor's system reliability	Price	Vendor's support quality/policies	Product info number [2]
93	257/Win NT 4.0	very good	very good	good	average	good/outstanding	–
89	237/Win 98	outstanding	outstanding	good	very expensive	good/outstanding	645
88	235/Win 98	outstanding	outstanding	good	very expensive	fair/outstanding	646
88	234/Win 98	outstanding	very good	good	expensive	good/good	–
85	250/Win NT 4.0	very good	outstanding	[3]	average	fair [4]/good	647
81	248/Win NT 4.0	very good	very good	[3]	average	good [4]/outstanding	648
81	212/Win 98	good	good	good	average	good/good	–
77	204/Win 98	satisfactory	outstanding	good	average	fair/outstanding	649
76	213/Win 98	good	outstanding	[3]	average	fair [4]/good	650
76	216/Win 98	good	outstanding	[3]	average	good [4]/good	651
75	230/Win 98	outstanding	very good	[3]	expensive	fair [4]/good	652
75	218/Win 95	good	good	outstanding	expensive	good [4]/good	653
75	256/Win NT 4.0	very good	good	[3]	expensive	good [4]/outstanding	654
75	218/Win 98	good	very good	[3]	expensive	good [4]/good	655
73	219/Win 98	good	satisfactory	fair	average	good/good	–
73	222/Win 98	very good	good	[3]	average	good [4]/good	656
73	213/Win 98	good	good	[3]	average	good [4]/outstanding	657
73	263/Win NT 4.0	outstanding	satisfactory	good	average	good/poor	658
71	214/Win 98	good	satisfactory	good	inexpensive	fair/outstanding	659
71	216/Win 98	good	good	good	average	good/poor	660
Scorecard weightings ▶		Performance 25 percent	Features 25 percent	Reliability 15 percent	Price 15 percent	Quality/policies 10 percent each	

[3] Insufficient data to give a rating.

[4] Scores were derived from anonymous support-quality calls due to insufficient data from survey.

This Month's Best Buys

1 DELL OPTIPLEX GX1P 450

PRO: Large hard drive, plenty of expansion slots

CON: Few open bays, RAM sockets hard to access

The Dell OptiPlex GX1p 450 holds its own against the Pentium III onslaught, delivering a competitive price ($2449) and a still-quick PC WorldBench 98 score of 257 on Windows NT.

To maximize its expandability, the system features a backplane design—the motherboard is mounted in an expansion slot circuit board. Thanks to this design and the extra-wide midtower case, the OptiPlex can handle up to seven add-in expansion cards, and it ships with a phenomenal six open slots (three PCI, two ISA, and one shared ISA/PCI).

Dell OptiPlex GX1p 450

In addition to bundling a 3Com Fast EtherLink XL card with the system, Dell offers its own proprietary Open Manage Client Administrator, a feature that IS professionals are sure to appreciate. The OptiPlex reverts to PCI graphics technology, using an STB NVidia TNT adapter in tandem with Dell's own high-quality D1028L 17-inch monitor.

Though the OptiPlex has plenty of expansion slots, it's a bit short on open drive bays, offering only one externally accessible 5.25-inch bay and one internal bay. Adding RAM to this machine might be a hassle, since the processor and power supply partially block access to the DIMM sockets. Our test system arrived sans speakers; you can add a pair for either $49 or $105, depending on the models you choose.

2 MICRON MILLENNIA 500 MAX

PRO: First PC on chart with a 6X DVD-ROM drive, impressive multimedia components, good manual

CON: Expensive

Of the six systems we tested that carry Intel's new Pentium III CPU at their core, Micron's new Millennia 500 Max debuts with the best overall rating. This loaded system roared to a PC WorldBench 98 score of 237—the highest ever for a PC equipped with 128MB of RAM and running Windows 98.

At $2899, it's also one of the two most expensive systems on this month's chart. That premium price covers one of the first 6X DVD-ROM drives we've seen, a Zip drive, and a 19-inch monitor that displays crisp images. If the 500 Max is too rich for your blood, consider the $2599 Millennia 450 Max, which also comes with a Pentium III CPU. Aside from the 450 Max's slower processor and its somewhat smaller hard drive (14.4GB versus 22GB), the systems are identical. The 450 Max's PC WorldBench 98 score of 219 is 8 percent behind its big brother's; meanwhile, ▶

Micron Millennia 500 Max

TOP 20 POWER DESKTOPS — STANDARD FEATURES

	SYSTEM [1]	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter (AGP unless noted)	Video RAM (MB/type)	Monitor tube/viewable diagonal (inches)	56-kbps modem protocol
1	Dell OptiPlex GX1p 450*	Pentium II-450	Windows NT 4.0	128	512	14.4	integrated STB TNT [3]	16/SDRAM	17/15.9	not included
2	Micron Millennia 500 Max*	Pentium III-500	Windows 98	128	512	22	Diamond Viper V550	16/SDRAM	19/17.9	V.90
3	Gateway E-4200 500*	Pentium III-500	Windows 98	128	512	22	ATI Rage 128	16/SDRAM	19/18	not included
4	Dell Dimension XPS T500*	Pentium III-500	Windows 98	128	512	22	STB Velocity 4400	16/SDRAM	17/15.9	V.90
5	Quantex QP6/450 SB-4*	Pentium II-450	Windows NT 4.0	128	512	16.8	Number Nine Revolution IV	32/SDRAM	19/18	not included
6	MidWest Micro WKP-450	Pentium II-450	Windows NT 4.0	128	512	12.1	STB Velocity 4400	16/SDRAM	19/18	not included
7	Dell Dimension XPS R450	Pentium II-450	Windows 98	128	512	10	STB Velocity 128zx	8/SGRAM	17/16	V.90
8	Gateway E-4200 450	Pentium II-450	Windows 98	128	512	10	ATI Rage Pro Turbo	8/SGRAM	19/18	not included
9	Quantex QP6/450 SM-4x	Pentium II-450	Windows 98	128	512	16.8	STB Velocity 4400	16/SDRAM	19/18	V.90
10	IDot.com Entrepreneur 4	Pentium II-450	Windows 98	128	512	16	Creative Blaster RIVA TNT	16/SDRAM	17/16	V.90
11	CompUSA American Pro 500	Pentium III-500	Windows 98	128	512	14.4	STB Velocity 4400	16/SDRAM	19/17.6	V.90
12	NEC PowerMate 8100	Pentium II-450	Windows 95	64	512	14.4	Accel Graphics AccelStar II	8/SDRAM	17/15	not included
13	Axis Systems Metropolis GX7-S PII-400	Pentium II-400	Windows NT 4.0	128	512	9.1	Diamond Viper V550	16/SDRAM	19/17.9	not included
14	Acma ZPower 7450 PII-450	Pentium II-450	Windows 98	128	512	14.4	Number Nine Revolution IV	16/SDRAM	17/16.1	V.90
15	IBM PC 300 PL	Pentium II-450	Windows 98	64	512	9.1	Matrox Millennium G200	8/SGRAM	17/16	not included
16	Sys Performance Pro 450	Pentium II-450	Windows 98	128	512	10.1	Matrox Millennium G200	8/SGRAM	17/15.8	V.90
17	Axis Systems Orion 100V DVD 450	Pentium II-450	Windows 98	128	512	13.7	Diamond Viper V550	16/SDRAM	19/18	V.90
18	HP Brio 8500 PII-450	Pentium II-450	Windows NT 4.0	64	512	10.1	integrated ATI Rage Pro	4/SGRAM	17/16	not included
19	Compaq Deskpro EP 6450	Pentium II-450	Windows 98	64	512	10	Matrox Millennium G200	8/SGRAM	17/16	K56flex
20	HP Vectra VL Series 8 HE	Pentium II-450	Windows 98	64	512	10.1	integrated Matrox G200	8/SGRAM	17/16	not included

* Best Buy

[1] Configuration as tested. Vendor may have since changed components.

[2] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.

[3] PCI-based graphics.

at $300 less, it's a full 10 percent cheaper.

You'll be impressed by the multimedia capabilities of either Millennia Max system. Both ship with the Diamond Viper V550, a recent contender among AGP cards on our *Top 10 Graphics Boards* list. The Monsoon MM-1000's big subwoofer (itself the size of a compact stereo system) and a pair of satellite speakers produce rich high and low tones.

Micron includes strong documentation and support with its PCs. The warranty covers labor for one year and parts for three years (main RAM and CPU are covered for five years). Micron provides free continuous phone support for the lifetime of the PC. The company's work systems garnered a rating of good in our recent reliability and support survey.

3 GATEWAY E-4200 500

PRO: Great speed, good mix of features

CON: No DVD-ROM drive or software bundle

With a $2899 price tag, Gateway's E-4200 500 ties for most expensive among the new PIII systems in Best Buy territory. Its PC WorldBench 98 score of 235 puts it in a virtual dead heat with the other two speed merchants.

This tall, wide midtower with ethernet adapter will appeal to corporate users who want high performance and management options. If you care more about price than having the fastest toy, consider Gateway's E-4200 Pentium III-450: It costs less ($2359), has an equally large hard drive (22GB), and put together a strong PC WorldBench 98 score of 220. Paying $540 more for the E-4200 500 does buy you a 15 percent speed boost.

The ATI Rage 128 graphics card helps the 19-inch Gateway monitor show crisp, clear pictures. The system's Altec Lansing GCS100 speakers and subwoofer deliver rich, full sound.

Unlike the Pentium III–based systems from Micron and Dell, the E-4200 came without a software bundle, but corporate users with software licenses might not mind. As usual, Gateway supplies excellent documentation, and the company's record for system reliability is strong. Readers ranked Gateway's support for work PCs as only fair, however.

Gateway E-4200 500

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style [2]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
17X-40X	integrated Crystal PnP	midtower	384	2	1/1	6	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
6X DVD-ROM	Sound Blaster Live Value	midtower	384	2	2/1	3	varies [4]/1	24	Sat, Sun	BBS, CIS, WWW
13X-32X	Creative Ensoniq AudioPCI	midtower	384	2	3/2	2	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
4.8X DVD-ROM	Turtle Beach Montego II PCI	midtower	768	2	2/1	2	3/1	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
14X-32X	Creative Ensoniq AudioPCI	midtower	768	1	3/3	4	3/1	24	Sat, Sun	BBS, WWW
16X-40X	Sound Blaster PCI128	midtower	768	2	3/1	3	varies [4]/3	24	Sat, Sun	BBS, WWW
4.8X DVD-ROM	Turtle Beach Montego	midtower	768	2	2/1	2	3/1	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
13X-32X	Sound Blaster Audio PCI 64V	midtower	384	2	3/2	3	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
4.8X DVD-ROM	Creative Audio PCI 64V	midtower	768	1	2/3	4	3/1	24	Sat, Sun	BBS, WWW
4.8X DVD-ROM	Turtle Beach Montego II PCI	midtower	1024	3	2/0	3	varies [4]/1	24	Sat, Sun	WWW
4.8X DVD-ROM	Sound Blaster Live	midtower	768	2	2/1	3	varies [5]/1	24	Sat, Sun	WWW
12X-32X	integrated Crystal PnP	midtower	384	2	2/1	5	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
14X-32X	Creative Ensoniq AudioPCI	midtower	512	3	3/0	3	3/3	24	Sat, Sun	WWW
4.8X DVD-ROM	Sound Blaster Live	midtower	384	2	1/0	1	3/1	24	Sat, Sun	BBS, WWW
14X-32X	integrated Crystal PnP	desktop	384	2	1/0	4	varies [6]/5	24	Sat, Sun	AOL, BBS, CIS, WWW
17X-40X	Sound Blaster AWE64	midtower	1024	3	3/2	4	3/1	24	Sat, Sun	WWW
4.8X DVD-ROM	Sound Blaster Live	midtower	384	2	2/0	4	3/3	24	Sat, Sun	WWW
12X-24X	Aztech AZT2320	midtower	384	2	3/0	3	3/90 days	16	none	AOL, CIS, WWW
12X-32X	integrated ESS 1869	desktop	384	2	0/1	3	3/1	24	Sat, Sun	AOL, BBS, CIS, WWW
12X-32X	Aztech AZT2320	minitower	384	2	2/1	4	3/1 [7]	12	none	AOL, BBS, CIS, WWW

[4] Five years on CPU and main RAM, three years on other parts.

[5] One year on monitor, three years on other parts.

[6] Six years on CPU and main RAM, three years on other parts.

[7] Tech support is free for one year, then $99 per year. On-site service is free for 90 days.

4 DELL DIMENSION XPS T500

PRO: 4.8X DVD-ROM drive with hardware decoder card, good record for reliability and support

CON: No standard 3.5-inch floppy drive

If you seek a feature-rich, multimedia-capable system for your growing business, the $2816 Dell Dimension XPS T500 may give you a good excuse to splurge. The thin, gray midtower has what your office needs—plus a little extra for after-hours fun. The XPS T500, with its fast new Pentium III-500 CPU, earned a PC WorldBench score of 234, just a couple of ticks behind the number two Micron Millennia 500 Max.

Dell Dimension XPS T500

Color-coded, labeled, and icon-marked ports, plus a good assortment of peripheral manuals and an illustrated foldout setup guide, make getting up and running a snap. And the XPS T500's easy-open, sturdy case and tidy interior make accessing RAM a snap when you're ready to add more. The sturdy Dell QuietKey keyboard proved comfortable and solid.

The system includes a CineMaster hardware DVD decoder card with a 4.8X DVD-ROM drive for better video playback, and the giant 22GB hard disk and Iomega Zip drive should give even a pack rat plenty of elbowroom. And teamed with the Turtle Beach Montego II PCI Audio sound card, the Altec Lansing ACS295 speaker-subwoofer system delivers realistic sound.

You can call Dell around the clock for technical assistance, and in our surveys *PC World* readers consistently rate the company's office PCs as reliable.

5 QUANTEX QP6/450 SB-4

PRO: Very fast, spacious hard drive, large monitor

CON: Fair support quality

Helping the first-place Dell spoil the Pentium III picnic is Quantex's QP6/450 SB-4. This $2299 business graphics system flashes a PC WorldBench 98 score of 250, as befits its Pentium II-450 processor and Windows NT 4.0 operating system.

The SB-4's 16.8GB hard disk gives you plenty of space for storing high-resolution graphics files (which you can view on the spacious 19-inch monitor), and the Number Nine Revolution IV graphics ▶

board packs a whopping 32MB of RAM—some PCs have less *system* RAM. These features, plus a network card, will make this midtower welcome in many offices.

But more doesn't always mean better. For most users, even business-graphics professionals, 8MB of graphics RAM is plenty. Most of the additional memory goes to texturing, which no business program (and few games) can take advantage of. Quantex offers fairly standard support policies—a three-year parts/one-year labor warranty and around-the-clock phone support. In our anonymous calls to the company's technical support line, we waited for about 20 minutes, on average, before speaking with a technician. Quantex representatives proved reasonably helpful, though they didn't always nail our more difficult questions.

Quantex QP6/450 SB-4

New This Month

The following systems made our Power Desktops chart for the first time this month. For brief reviews of previously tested machines on the chart, visit PC World Online (www.pcworld.com/top400).

6 MIDWEST MICRO BUSINESS SOLUTIONS WKP-450

PRO: Outstanding support policies, excellent monitor

CON: Slow for a PII-450 PC, poor bay access ▶

TOP 20 POWER DESKTOPS

TEST REPORT

	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score
1	Dell OptiPlex GX1p 450*	Pentium II-450	Win NT 4.0	128	512	257
2	Micron Millennia 500 Max*	Pentium III-500	Win 98	128	512	237
3	Gateway E-4200 500*	Pentium III-500	Win 98	128	512	235
4	Dell Dimension XPS T500*	Pentium III-500	Win 98	128	512	234
5	Quantex QP6/450 SB-4*	Pentium II-450	Win NT 4.0	128	512	250
6	MidWest Micro Business Solutions WKP-450	Pentium II-450	Win NT 4.0	128	512	248
7	Dell Dimension XPS R450	Pentium II-450	Win 98	128	512	212
8	Gateway E-4200 450	Pentium II-450	Win 98	128	512	204
9	Quantex QP6/450 SM-4x	Pentium II-450	Win 98	128	512	213
10	IDot.com Entrepreneur 4	Pentium II-450	Win 98	128	512	216
11	CompUSA American Pro 500	Pentium III-500	Win 98	128	512	230
12	NEC PowerMate 8100	Pentium II-450	Win 95	64	512	218
13	Axis Systems Metropolis GX7-S PII-400	Pentium II-400	Win NT 4.0	128	512	256
14	Acma ZPower 7450 PII-450	Pentium II-450	Win 98	128	512	218
15	IBM PC 300 PL	Pentium II-450	Win 98	64	512	219
16	Sys Performance Pro 450	Pentium II-450	Win 98	128	512	222
17	Axis Systems Orion 100V DVD 450	Pentium II-450	Win 98	128	512	213
18	HP Brio 8500 PII-450	Pentium II-450	Win NT 4.0	64	512	263
19	Compaq Deskpro EP 6450	Pentium II-450	Win 98	64	512	214
20	HP Vectra VL Series 8 HE	Pentium II-450	Win 98	64	512	216

*Best Buy

Word 97 | Word Pro 97 | Excel 97 | 1-2-3 97 | Paradox 8.0 | Picture Publisher 7.0

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, *PC World*'s application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with Windows 95, Windows 98, or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Under Windows 98 with 128MB of RAM; also includes systems tested in this and previous months that do not currently rank among the Top 20 systems.

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At $2499, the WKP-450 comes packed with an array of worthwhile options for the small or home office, including a network card, an LS-120 SuperDisk drive, and Microsoft's Natural Keyboard.

The KDS VS195 19-inch monitor, in combination with the STB Velocity 4400 (a Best Buy graphics card this month), delivers clean, easy-to-read text and sharp images at resolutions up to 1600 by 1200.

Midwest Micro WKP-450

Getting to the guts of the system for maintenance and upgrades proved fairly easy, thanks to an access panel that you can slip off without having to use any tools. Inside, two of the system's three DIMM sockets are available. Our only gripe: The machine's internal cabling partly obstructed those sockets. Still, with four open drive bays and three open slots, the overall expansion capabilities of this system are above average.

MidWest Micro provides a full set of manuals, with component documentation, an overall system manual, and a setup poster to get you started. Phone technical support is available around the clock.

10 IDOT.COM ENTREPRENEUR 4

PRO: Zip drive; large hard drive for a PII-450

CON: Mediocre monitor

From the Zip drive to the bundled Corel WordPerfect Suite 8, the $2499 IDot.com Entrepreneur 4 fulfills your home office needs. Its PC WorldBench 98 score of 216 is about par in the PII-450 processor class.

The PC ships with a hefty 16GB hard drive. Although the high-quality Creative Labs Blaster RIVA TNT will suit users interested in work or play, the 17-inch Momenta monitor produced an annoyingly indistinct picture. An Altec Lansing ADA305 surround system with subwoofer delivers rich, full sound. While many PCs these days ship with Microsoft's IntelliMouse, IDot opts for Logitech's wide three-button mouse; some users may find its girth hard to get used to.

IDot.com Entrepreneur 4

The neatly organized interior of this gray, curved-top midtower houses two open drive bays and three free slots. IDot offers a strong support policy, including around-the-clock support on a toll-free line. The owner's guide that comes with this machine is a tad thin but includes comprehensive information on removing the chassis and doing upgrades.

11 COMPUSA AMERICAN PRO 500

PRO: Extremely fast, good sound

CON: Slowest PIII-500 PC, weak phone support

Bringing up the rear among the Pentium III–based systems is the patriotically named American Pro 500 from CompUSA. Its PC WorldBench score of 230 makes it the slowest PIII-500 PC, but even so it's pretty quick—think of it as finishing fifth in an Olympic sprint. The American Pro 500 is 7 percent faster than the average Pentium II-450 PC of similar configuration.

American Pro 500

At $2892, this gray midtower costs about as much as the Best Buy PIII-500 systems, but it falls short of them in other respects.

The 19-inch Multiscan monitor sports a crisp picture, but it was marred by an unacceptable level of screen flicker at 1280 by 1024 resolution—at least on our test PC. Even when we cranked the refresh rate up to 85 Hz, the display was hard on our eyes. We did like the bundled Cambridge Soundworks Desktop Theatre 5.1 surround system, which joins forces with the Sound Blaster Live sound card to deliver great treble and midrange clarity.

The PC comes with an online version of documentation for the system itself–we would have preferred to get a print version, too–and printed manuals for all the components. CompUSA's warranty covers labor for one year and parts for three years (except for the monitor, which has one year of coverage). In our latest reader survey, we received too few comments on CompUSA systems to assign the vendor a reliability rating. Phone tech support operates round the clock. But the reps we spoke to in our anonymous calls weren't as helpful as they might have been.

17 AXIS SYSTEMS ORION 100V DVD 450

PRO: Superb picture, video, and sound; Zip drive

CON: So-so documentation, few free drive bays

Axis Systems' $2299 Orion 100V DVD 450 will please most multimedia mavens. When we inserted a DVD-ROM and fired up the Altec Lansing ADA305 speakers, people came from all over the lab to check out the killer video and surround sound.

Great graphics aren't limited to video playback, either. The 19-inch Optiquest V95 monitor and Diamond Viper V550 graphics adapter display crystal-clear graphic images, even at a the ultrafine resolution of 1600 by 1200. DVD video playback was mediocre at resolutions of 1024 by 768 or lower, but gorgeous at 1280 by 768 and 1600 by 1200.

On our WorldBench test suite, the Orion scored close to the median for PII-450 systems. It ships with a 13.7GB hard disk, versus the 10GB or smaller hard drives commonly found with systems in this price range.

With the Zip drive in place, the system offers a meager two open drive bays. Still, we had no trouble accessing most of the system's innards. But Axis provides only component manuals—there's no overall system guide. The company backs its systems with good a three-year parts-and-labor warranty that includes one complete year of on-site service (which you can extend to two or three years for $75 annually). Axis provides free lifetime 24/7 telephone technical support. Its phone representatives answered our anonymous calls promptly and gave us helpful advice. ▶

Axis Orion 100V DVD 450

BEYOND THE TOP 20

We evaluated the following systems along with the others, but they didn't score high enough to reach the Top 20 Power Desktops chart. For write-ups, go to PC World Online (www.pcworld.com/t20pcs).

- **Quantex VX450**
- **Xi Computer Mtower 900X DP**

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PC WORLD

TOP 20 BUDGET DESKTOPS

	SYSTEM	Last month	Month tested	Street price (1/15/98)	CPU	Comments
1	Micron Millennia 450 Max 888/634-8799 www.micronpc.com	n/a	Nov 98	$1999	Pentium II-450	$386 price drop moves quick PC to budget chart; DVD-ROM drive speed increased to 6X.
2	Dell Dimension V350 800/388-8542 www.dell.com	1	Mar 99	$1505	Pentium II-350	CD-ROM drive speed increased to 40X max; price up $106 on quick small-business PC.
3	Gateway GP6-400 800/315-2536 www.gateway.com	4	Mar 99	$1799	Pentium II-400	$100 off quick, expandable small-business PC with network card and sharp monitor.
4	Dell OptiPlex GX1 400 800/388-8542 www.dell.com	5	Aug 98	$1899	Pentium II-400	Fast corporate PC with easy-service design and network card features seven open slots.
5	Micro Express MicroFlex-450A 800/989-9900 www.microexpress.net	n/a	NEW	$1899	Pentium II-450	Well-designed small-business system with excellent components and top-notch speed.
6	Axis Systems Orion 100C DVD 800/378-9014 www.axissys.com	n/a	NEW	$1748	Pentium II-450	New offering in multimedia line boasts good price and performance for a PII-450 PC.
7	CyberMax Enthusiast KII-400R 800/437-4596 www.cybermaxpc.com	n/a	NEW	$1499	AMD K6-2-400	Inexpensive small-office PC stocked with 19-inch monitor, Zip drive, DVD-ROM drive.
8	Compaq Prosignia Desktop 330 800/345-1518 www.compaq.com	n/a	Feb 99	$1999	Pentium II-450	$125 drop moves small-business PC with network card and modem onto budget chart.
9	Quantex QP6/400 M-4x SE 800/896-4898 www.quantex.com	10	Mar 99	$1949	Pentium II-400	Loaded multimedia PC features DVD-ROM drive, 19-inch monitor.
10	Sys TaskMaster 366C 800/613-9963 www.sys.com	n/a	NEW	$1399	Celeron-366	Great expandability options and good support policies; lacks a system manual.
11	Xi Computer 333A Mtower 800/432-0486 www.xicomputer.com	8	Mar 99	$1399	Celeron-333	Fastest Celeron-333 PC we've tested with Win 98; good price and management features.
12	Gateway E-3200 450 800/315-2536 www.gateway.com	11	Mar 99	$1999	Pentium II-450	Well-designed corporate PC performs like many PII-400s; just two open drive bays.
13	MidWest Micro Office Pro 350 800/728-8582 www.mwmicro.com	18	Feb 99	$1499	Pentium II-350	Average-price PC benefits from DVD-ROM drive and strong warranty.
14	Micron Millennia C366 888/634-8799 www.micronpc.com	n/a	NEW	$1279	Celeron-366	Lowest-price Celeron-366 PC on chart; performance merely adequate for configuration.
15	Micro Express MicroFlex-4A 800/989-9900 www.microexpress.net	n/a	NEW	$1499	AMD K6-2-400	Small office PC comes with 19-inch monitor, 9.6GB hard disk, and 5X DVD-ROM drive.
16	Acma ZPower 6400 PII-400 800/786-6888 www.acma.com	16	Oct 98	$1888	Pentium II-400	Network-ready corporate PC with modem has Zip drive, big 14.4GB hard disk.
17	CompUSA American Pro 366 888/226-6772 www.compusa.com	n/a	NEW	$1692	Celeron-366	New offering from CompUSA's small-office line features good sound and Zip drive.
18	Compaq Prosignia Desktop 310 800/345-1518 www.compaq.com	n/a	NEW	$1399	Celeron-366	New PC from small-business Prosignia line has competitive price, little else.
19	Polywell Poly 8450 B5 800/999-1278 www.polywell.com	n/a	Jan 99	$1999	Pentium II-450	$39 price cut moves fastest Win 98 PC to budget chart; parts warranty now three years.
20	Axis Systems Metropolis NX5-333C 800/378-9014 www.axissys.com	15	Mar 99	$1144	Celeron-333	Network card offsets puny hard disk and lack of software bundle on corporate PC.

Best Buy See features chart, page 240; test report, page 244.

n/a = not applicable

[1] A system's performance word score is relative to scores of other PCs running the same operating system. For more details see "Your Guide to the Top 100" on page 228.

[2] For more information about all products in this table, select product info number 903 or visit www.pcworld.com/productinfo.

EIGHT NEW SYSTEMS GRACE OUR BUDGET CHART this month, starting with the Best Buy MicroFlex-450A from Micro Express, which finishes fifth overall. This PC combines good PII-450 performance with strong features (including a 19-inch monitor and 3X DVD-ROM) for $1899. We also reviewed four systems equipped with the new Celeron-366 CPU from Intel, and all made our chart, led by the $1399 Sys TaskMaster 366C. To round out a busy month, we took a first look at PCs built around AMD's new K6-2-400 chip. Two reach the Top 20, led by CyberMax's Enthusiast KII-400R, stocked with a 19-inch monitor, a Zip drive, and a DVD-ROM drive. A TigerDirect K-Series system failed to make the chart.

SCORECARD

★ Overall rating	PC WorldBench 98/operating system	Features and design	Price	Performance [1]	Vendor's system reliability	Vendor's support quality/policies	Product info number [2]
88	218/Win 98	good	very expensive	outstanding	good	good/outstanding	628
86	179/Win 98	satisfactory	average	good	good	good/good	–
85	203/Win 98	good	expensive	very good	good	fair/outstanding	629
85	244/Win NT 4.0	satisfactory	expensive	very good	good	good/outstanding	–
84	221/Win 98	good	expensive	outstanding	[3]	fair [4]/outstanding	630
84	210/Win 98	good	expensive	very good	[3]	good [4]/outstanding	631
83	187/Win 98	very good	average	good	[3]	fair [4]/good	632
82	210/Win 98	good	very expensive	very good	good	fair/good	633
81	203/Win 98	very good	very expensive	very good	[3]	fair [4]/good	634
80	193/Win 98	good	inexpensive	good	[3]	fair [4]/good	635
80	182/Win 98	good	inexpensive	good	[3]	good [4]/good	636
80	208/Win 98	satisfactory	very expensive	very good	good	fair/outstanding	637
79	181/Win 98	good	average	good	[3]	good [4]/outstanding	638
78	186/Win 98	limited	inexpensive	good	good	good/outstanding	639
78	183/Win 98	satisfactory	average	good	[3]	fair [4]/outstanding	640
78	198/Win 95	good	expensive	very good	[3]	good [4]/good	641
77	188/Win 98	good	average	good	[3]	fair [4]/good	642
76	170/Win 98	satisfactory	inexpensive	satisfactory	good	fair/good	643
75	224/Win 98	good	very expensive	outstanding	[3]	fair [4]/poor	644
75	198/Win NT 4.0	satisfactory	very inexpensive	satisfactory	[3]	good [4]/outstanding	687
Scorecard weightings ▶		Features 25 percent	Price 22 percent	Performance 18 percent	Reliability 15 percent	Quality/policies 10 percent each	

[3] Insufficient data to give a rating.

[4] Scores were derived from anonymous support-quality calls due to insufficient data from survey.

This Month's Best Buys

1 MICRON MILLENNIA 450 MAX

PRO: Excellent performance, DVD-ROM drive, good track record on reliability and service

CON: Audio subsystem is only average

A big $386 price reduction moves the Micron Millennia 450 Max to the budget chart this month, but it doesn't cut back on the system's power performance. With a PC WorldBench 98 score of 218, the $1999 450 Max outruns many of its similarly configured peers.

This machine should please most business multimedia users, though you may want to upgrade the fine 17-inch Micron 700VX monitor to a 19- or 21-inch model.

The 450 Max's sleek, curved front bezel is a refreshing departure from the beige-box syndrome. A removable cover artfully conceals the PC's externally accessible drive bays. On the back, thumbscrews and latches let you pop the side cover easily to add memory and expansion cards.

Micron Millennia 450 Max

On the downside, the integrated Crystal sound chip lacks an on-board wavetable, and the bundled Advent AV009 speakers deliver tinny sound. In our tests, the monitor's picture remained too dark during DVD video playback even after we boosted the brightness setting. And though it has a DVD-ROM drive, the system lacks an MPEG-2 decoder card (Micron does include a software decoder, however).

Micron backs the Millennia 450 Max with around-the-clock technical support, and, based on our latest reader survey, its systems tend to be reliable.

2 DELL DIMENSION V350

PRO: Inexpensive for a PII-350 PC, good support and warranty, color-coded connectors

CON: So-so monitor, case is difficult to open

Dell continues its tradition of competitive pricing with this system from its Dimension V small-business line. The V350 now ships with a 40X-maximum-speed CD-ROM drive (up from 32X), which helps explain the $106 price increase (to $1505) since last month. A PC WorldBench 98 score of 179 places the Dimension V350 close to the average for PII-350 PCs with 64MB of RAM.

Rather than providing separate cards for graphics and sound, Dell integrates those functions into chips on the motherboard, freeing valuable expansion slots. The V350 unites ATI's increasingly popular Rage Pro graphics chip set with the superior Yamaha XG MIDI sound system for a good audio-video combo. Color-coded ports and connectors simplify setup.

Dell Dimension V350

Dell's 17-inch 1000HS monitor provides a clear picture all the way up to 1024-by-768 resolution. At higher set- ▶

TOP 20 BUDGET DESKTOPS — STANDARD FEATURES

	SYSTEM [1]	CPU	Operating system	RAM (MB)	Secondary cache (KB)	Hard drive (GB)	Graphics adapter (AGP)	Video RAM (MB/type)	Monitor tube/ viewable diagonal (inches)	56-kbps modem protocol
1	Micron Millennia 450 Max*	Pentium II-450	Windows 98	64	512	14.4	Diamond Viper V550	16/SGRAM	17/15.9	V.90
2	Dell Dimension V350*	Pentium II-350	Windows 98	64	512	8.4	integrated ATI Rage Pro	8/SDRAM	17/15.9	V.90
3	Gateway GP6-400*	Pentium II-400	Windows 98	64	512	10.1	Ensoniq 3D 8laster 8anshee	16/SGRAM	17/16	not included
4	Dell OptiPlex GX1 400*	Pentium II-400	Windows NT 4.0	64	512	6.4	integrated ATI Rage Pro	8/SGRAM	17/15.9	not included
5	Micro Express MicroFlex-450A*	Pentium II-450	Windows 98	128	512	9.6	Creative Labs 8laster RIVA TNT	16/SDRAM	19/17.9	V.90
6	Axis Systems Orion 100C DVD	Pentium II-450	Windows 98	128	512	8.4	Intel 740i	8/SDRAM	17/15.8	V.90
7	CyberMax Enthusiast KII-400R	AMD K6-2-400	Windows 98	64	512	10	STB Velocity 4400	16/SDRAM	19/18	V.90
8	Compaq Prosignia Desktop 330	Pentium II-450	Windows 98	128	512	16.8	STB Velocity 4400	16/SDRAM	17/16	V.90
9	Quantex QP6/400 M-4x SE	Pentium II-400	Windows 98	128	512	13.6	Diamond Stealth II G460	8/SDRAM	19/18	V.90
10	Sys TaskMaster 366C	Celeron-366	Windows 98	64	128	6.4	Eon Lilith 8anshee	16/SGRAM	17/15.7	V.90
11	Xi Computer 333A Mtower	Celeron-333	Windows 98	64	128	14	Matrox Millennium G200	8/SGRAM	17/16	V.90
12	Gateway E-3200 450	Pentium II-450	Windows 98	128	512	10	integrated ATI Rage Pro	4/SGRAM	17/16	not included
13	MidWest Micro Office Pro 350	Pentium II-350	Windows 98	64	512	6.4	ATI Xpert@Play98	8/SGRAM	17/15.8	V.90
14	Micron Millennia C366	Celeron-366	Windows 98	64	128	8	integrated NVidia RIVA 128zx	8/SGRAM	17/15.9	V.90
15	Micro Express MicroFlex-4A	AMD K6-2-400	Windows 98	64	1024	9.6	Diamond Monster Fusion	16/SGRAM	19/17.9	V.90
16	Acma ZPower 6400 PII-400	Pentium II-400	Windows 95	64	512	14.4	Real 3D StarFighter AGP	8/SGRAM	17/16.1	V.90
17	CompUSA American Pro 366	Celeron-366	Windows 98	64	128	13.7	ST8 Velocity 4400	16/SDRAM	17/15.6	V.90
18	Compaq Prosignia Desktop 310	Celeron-366	Windows 98	64	128	10	Diamond Viper V330	4/SGRAM	17/16	V.90
19	Polywell Poly 8450 B5	Pentium II-450	Windows 98	128	512	10	Matrox Millennium G200	8/SGRAM	17/16	V.90
20	Axis Systems Metropolis NX5-333C	Celeron-333	Windows NT 4.0	64	128	4.3	Intel 740i	8/SDRAM	17/15.7	not included

* 8est 8uy

[1] Configuration as tested. Vendor may have since changed components.

[2] *PC World* defines towers as taller than 20 inches, midtowers as 15.5 inches to 20 inches, and minitowers as shorter than 15.5 inches.

[3] Five years on CPU and main RAM, three years on other parts.

tings, images get a bit fuzzy. Meanwhile, the Harman/Kardon HK195 speakers perform well, considering their price class, and offer wide dynamic range.

As usual, you get Dell's strong record for reliability and service, plus around-the-clock toll-free telephone technical support.

3 GATEWAY GP6-400

PRO: Strong warranty and support policies, Zip drive, ethernet adapter, good expandability, typically thorough documentation

CON: Average speed for a PII-400 system

If expandability is a higher priority for you than raw horsepower in a network PC, Gateway's GP6-400 may have your name on it.

Part of the company's small-business line, the $1799 GP6-400 sports a 3Com Fast EtherLink adapter, a three-year warranty on parts and labor, and strong support policies. It scored close to the average for Pentium II-400–based systems in our PC WorldBench 98 tests.

Gateway GP6-400

The midtower case can be opened easily by removing two thumbscrews; inside, you'll find four open expansion slots (three PCI, one shared ISA/PCI) and four open drive bays. Even when the included Zip drive is in place, you'll find two of the four available bays capable of accommodating additional backup devices.

Although the GP6-400's Ensoniq 3D Blaster Banshee graphics adapter can't support resolutions as high as those the ATI 3D Rage Pro handles, its top setting of 1280 by 1024 looks very respectable on Gateway's 17-inch EV700 monitor.

The GP6-400 ships with an ample 10.1GB hard drive, as well as a software bundle of McAfee Anti-Virus and Microsoft's Office 97 Small Business Edition with Bookshelf—welcome additions to any small-business environment.

4 DELL OPTIPLEX GX1 400

PRO: Attractively designed corporate system, easy access to interior, excellent monitor

CON: Relatively small hard drive, no AGP slot

The $1899, large-business–oriented Dell OptiPlex GX1 400 features integrated remote-management hardware, an easy-access interior,

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		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	Sound board	Case style [2]	Max. RAM (MB)	Open RAM sockets	Open drive bays (ext./int.)	Open slots	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
6X DVD-ROM	integrated Crystal PnP	midtower	384	1	3/1	4	varies [3]/1	24	Sat, Sun	BBS, CIS, WWW
14X-40X	integrated Yamaha XG	midtower	384	2	3/1	3	3/1	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
13X-32X	integrated Sound Blaster PCI	midtower	384	2	2/2	4	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
14X-32X	integrated Yamaha OPL3	midtower	384	2	2/1	7	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
3X DVD-ROM	Sound Blaster PCI 128	midtower	384	1	3/0	3	4/4	24	Sat, Sun	WWW
4.8X DVD-ROM	Sound Blaster PCI 128	midtower	384	2	3/0	4	3/3	24	Sat, Sun	WWW
4.8X DVD-ROM	Creative Ensoniq AudioPCI 64V	midtower	256	1	2/3	3	3/1	24	Sat, Sun	BBS, WWW
12X-40X	Creative Ensoniq AudioPCI	midtower	384	2	1/1	2	3/1	24	Sat, Sun	AOL, BBS, CIS, Prodigy, WWW
2X DVD-ROM	Creative Ensoniq AudioPCI 64V	midtower	384	1	2/3	4	3/1	24	Sat, Sun	BBS, WWW
14X-32X	Sound Blaster AWE64	midtower	1024	3	3/2	4	varies [4]/5	24	Sat, Sun	WWW
20X-40X	Creative Ensoniq AudioPCI	midtower	768	2	3/2	4	3/3	24	Sat, Sun	WWW
13X-32X	integrated Crystal PnP	desktop	384	2	1/1	3	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
4.8X DVD-ROM	Sound Blaster AWE64D	midtower	768	2	3/1	4	varies [3]/3	24	Sat, Sun	BBS, WWW
17X-40X	integrated ESS Maestro2 PCI	minitower	256	1	1/0	2	varies [3]/1	24	Sat, Sun	BBS, CIS, WWW
5X DVD-ROM	Sound Blaster PCI 128	midtower	384	4	3/0	3	4/4	24	Sat, Sun	WWW
12X-32X	integrated Crystal PnP	midtower	384	2	0/1	3	3/1	24	Sat, Sun	BBS, WWW
17X-40X	Creative Ensoniq AudioPCI	midtower	768	2	2/1	3	varies [5]/1	24	Sat, Sun	WWW
14X-32X	Compaq Premiere Labs	midtower	256	1	1/1	3	3/1	24	Sat, Sun	AOL, BBS, CIS, Prodigy, WWW
2X DVD-ROM	Aztech PCI 338-A3D	midtower	1024	3	3/1	3	3/5	24 [6]	Sat, Sun	WWW
14X-32X	Creative Ensoniq AudioPCI	midtower	384	2	3/0	4	3/3	24	Sat, Sun	WWW

[4] Six years on CPU and main RAM, three years on other parts.

[5] One year on monitor, three years on other parts.

[6] Around-the-clock support for one year, then 10 hours on weekdays, 4 hours on Saturday.

and impressive performance (a PC WorldBench 98 score of 244 on Windows NT).

Dell's high reliability and service scores are appealing. And every part of the OptiPlex swivels, glides, or swings open for easy access. To remove the case, press a button on the front and flick the case-lock switch at the back, and the cover swings up and out of the way. The unit lacks AGP slots, however, so you won't be able to upgrade the integrated AGP graphics chip.

Though the 6.4GB hard disk suffices for most uses, it's smallish by today's standards. The bundled Dell UltraScan 1000HS monitor, one of the best 17-inch Trinitron displays on the market, delivers excellent image sharpness and color.

Dell OptiPlex GX1 400

5 MICRO EXPRESS MICROFLEX-450A

PRO: Inexpensive, good graphics board, fast

CON: Difficult to remove case, poor manual

So you want a system with a touch of speed at a price that won't force you to eat beans and rice for supper for the next six months. Then have a look at the Micro Express MicroFlex-450A. With a PC WorldBench score of 221, the MicroFlex is within hailing distance of the quickest Windows 98 machines we've tested. And it's the second-cheapest Pentium II-450–based PC on this month's chart, at $1899.

Of course, not everything is top of the line: For example, though the 19-inch Impression 9 Plus monitor provides rich color, its image quality isn't as crisp as we'd like. Still, the MicroFlex does package some top-flight components, such as the Creative Labs Blaster RIVA TNT graphics board, excellent for 2D business graphics and after-hours gaming. The Altec Lansing ACS44 speaker/subwoofer combo delivers decent sound quality—and the two tiny satellites take up minimal space on your desk. Finally, the system's DVD decoder card lets you get the most out of the included 3X DVD-ROM drive.

If you decide to add extras like a Zip drive, you'll find room for a number of modest additions: three free card slots, one available DIMM, and three empty externally accessible drive bays. The machine's tidy interior should make ▶

MIND-BLOWING 128-BIT

THE RIVA TNT: WORLD'S FASTEST 3D PROCESSOR.**

Hold onto your armrests...you're not going to believe your eyes. The new RIVA TNT graphics processor delivers the most stunning, realistic graphics ever seen on a personal computer screen.

The RIVA TNT's 32-bit color TwiN Texel pipeline with support for 16 Megabytes of frame buffer dares 3D applications to run at an unheard of 1600x1200 resolution. RIVA TNT also delivers explosive 2D for your business applications, like Photoshop.

The RIVA TNT is the first 3D processor to provide hardware support for Microsoft's new DX6 API, as well as full OpenGL support for professional applications on the Windows platform of your choice. And it's available only from the best graphics card suppliers in the world such as Diamond, Creative Labs, Elsa, and Canopos.

Whether you are running one of the many new graphics-rich business applications, or playing the hottest new games, the RIVA TNT will blow you away. But don't just take our word for it. Head to our website at www.nvidia.com and we'll link you to those who have experienced the RIVA TNT firsthand. Then brace yourself; 'cuz this baby will blow the 3D market sky high.

*Award winning products include RIVA 128, RIVA 128ZX and RIVA TNT
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upgrading easier, but removing the snug case practically requires a chisel and mallet. Our advice? If you know ahead of time the particular configuration tweaks you want, ask the company to handle the installation before you get the system—it's that bad.

MicroFlex-450A

Micro Express offers a comprehensive support policy, including free on-site service and a four-year warranty on parts and labor. You'll enjoy toll-free around-the clock technical support; unfortunately, in our anonymous calls we discovered that the quality of the support was only fair. You may also be disappointed in the manual that accompanies your machine: It includes an entire section on Windows 3.1, even though it's been years and years since we've seen a new machine equipped with that operating system.

New This Month

The following systems made our Budget Desktops chart for the first time this month. For brief reviews of previously tested machines on the chart, visit our Web page (www.pcworld.com/top400).

6 AXIS SYSTEMS ORION 100C DVD

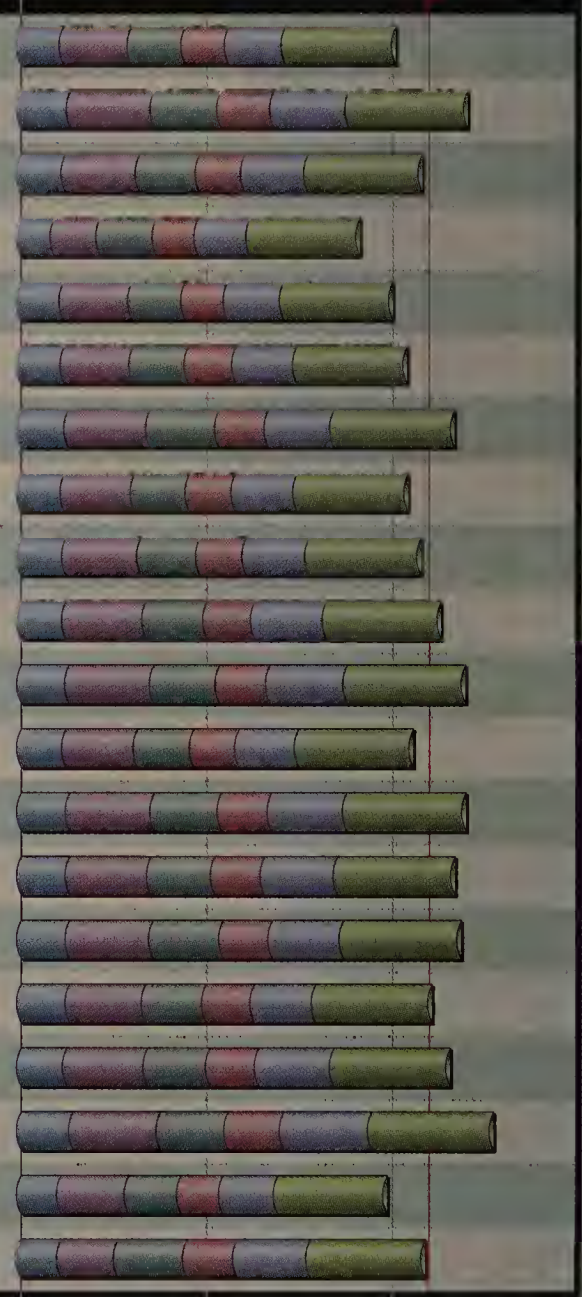
PRO: Good price for a PII-450 system

CON: Substandard keyboard, no-frills case

TOP 20 BUDGET DESKTOPS

TEST REPORT

	SYSTEM	CPU	Operating system	RAM (MB)	Secondary cache (KB)	PC WorldBench 98 score
1	Micron Millennia 450 Max*	Pentium II-450	Win 98	64	512	218
2	Dell Dimension V350*	Pentium II-350	Win 98	64	512	179
3	Gateway GP6-400*	Pentium II-400	Win 98	64	512	203
4	Dell OptiPlex GX1 400*	Pentium II-400	Win NT 4.0	64	512	244
5	Micro Express MicroFlex-450A*	Pentium II-450	Win 98	128	512	221
6	Axis Systems Orion 100C DVD	Pentium II-450	Win 98	128	512	210
7	CyberMax Enthusiast KII-400R	AMD K6-2-400	Win 98	64	512	187
8	Compaq Prosignia Desktop 330	Pentium II-450	Win 98	128	512	210
9	Quantex QP6/400 M-4x SE	Pentium II-400	Win 98	128	512	203
10	Sys TaskMaster 366C	Celeron-366	Win 98	64	128	193
11	Xi Computer 333A Mtower	Celeron-333	Win 98	64	128	182
12	Gateway E-3200 450	Pentium II-450	Win 98	128	512	208
13	MidWest Micro Office Pro 350	Pentium II-350	Win 98	64	512	181
14	Micron Millennia C366	Celeron-366	Win 98	64	128	186
15	Micro Express MicroFlex-4A	AMD K6-2-400	Win 98	64	1024	183
16	Acma ZPower 6400 PII-400	Pentium II-400	Win 95	64	512	198
17	CompUSA American Pro 366	Celeron-366	Win 98	64	128	188
18	Compaq Prosignia Desktop 310	Celeron-366	Win 98	64	128	170
19	Polywell Poly 8450 B5	Pentium II-450	Win 98	128	512	224
20	Axis Systems Metropolis NX5-333C	Celeron-333	Win NT 4.0	64	128	198



*Best Buy

Word 97 | Word Pro 97 | Excel 97 | 1-2-3 97 | Paradox 8.0 | Picture Publisher 7.0

TEST PC WORLD CENTER **HOW WE TEST** All systems are tested with PC WorldBench 98, *PC World*'s application-based benchmark. A higher PC WorldBench score is better. All PCs are tested with Windows 95, Windows 98, or Windows NT 4.0, and video resolution is set to 800 by 600 in 65,536 colors. We run automated scripts on six popular business applications, performing common tasks such as spelling checks, scrolls, saves, sorts, and recalculations. The PC WorldBench 98 score is a sum of the weighted, normalized result of each script: Word 97 (10 percent), Word Pro 97 (10 percent), Excel 97 (20 percent), 1-2-3 97 (20 percent), Paradox 8.0 (20 percent), and Picture Publisher 7.0 (20 percent). For more details on our benchmark and how we run it, see PC World Online (www.pcworld.com/testing). [1]Under Windows 98 with 64MB of RAM; also includes systems tested in this and previous months that do not currently rank among the Top 20 systems.

At $1748, the Axis Orion 100C DVD debuts as the lowest-price PII-450-based PC on this month's chart, $151 cheaper than the Best Buy. Though not beautiful to look at, the Axis midtower case contains some nice multimedia components.

With a PC WorldBench 98 score of 210, the Orion's performance trails that of the average PII-450 with 128MB of RAM by only 4 points. While the Toshiba 4.8X DVD-ROM drive delivers excellent DVD playback, the 17-inch KDS VS-7 monitor supplies only average picture quality. (At 1024 by 768 resolution, the edges of the screen got a bit fuzzy.) The Creative Labs Sound Blaster PCI 128 sound card and Altec Lansing ACS44 speaker set pumped out rich, clear sound. But we disliked the clunky, cheap-feeling KeyTronic keyboard and its undersize backspace key.

The Orion 100C DVD ships with Axis Systems' Productivity Bundle, which includes Lotus's 1-2-3 and Word Pro, Intuit's Quicken Basic, McAfee's VirusScan, and Microsoft Encarta. For $100 more, you can get Office 97 Small Business Edition in place of the Lotus software.

Axis Orion 100C DVD

You'll need a screwdriver to to open the sturdy case. The neatly organized interior offers an array of four free expansion slots and three free drive bays. Axis Systems' warranty covers three years for parts and labor; continuous toll-free phone support is available. In our anonymous calls to tech support, the company's representatives were thorough, and the longest we waited on hold was 12 minutes.

7 CYBERMAX ENTHUSIAST KII-400R

PRO: Includes 19-inch monitor, Zip drive, modem, and network card

CON: Subpar DVD video, limited expansion slots

Competitive pricing and extensive features nearly earned the CyberMax Enthusiast KII-400R a Best Buy. For $1499, you get a PC that includes a large monitor, a DVD-ROM drive, and both a modem *and* an ethernet adapter (making it an especially good choice for small businesses). The KII-400R's PC WorldBench 98 score of 187 approximates the scores earned by PII-350 systems—not lightning fast, but adequate for general business purposes.

The KII-400R comes with a Zip drive and an STB Velocity 4400 AGP graphics adapter. This board, when matched with the 19-inch CyberMax 1097F monitor, produced beautiful images at resolutions up to 1280 by 1024. We especially appreciated the generous screen size when we watched videos on the system's DVD-ROM drive. Unfortunately, the software decoder that comes with this system turned out images that had slightly jagged edges and jerky movement. The system ships with Corel WordPerfect Suite 8.

Enthusiast KII-400R

As for expansion capabilities, the CyberMax's case design allows easy access to all of the components, and the five available drive bays give you more than enough room to grow. That's why it's puzzling that CyberMax includes only one free PCI slot and two ISA slots, imposing a lower ceiling on other hardware upgrades. In our anonymous technical support calls, the company's representatives answered our questions correctly and promptly.

10 SYS TASKMASTER 366C

PRO: Inexpensive, good performance for a Celeron-366 PC, comprehensive support policies

CON: Smallish hard drive, graphics board from little-known vendor, no system manual

The Sys TaskMaster 366C ranks highest among the four Celeron-366–equipped systems we reviewed this month. With this no-nonsense PC you get all the basics you need for standard office work, without a fancy price tag. Just don't expect top-of-the-line components.

A PC WorldBench 98 score of 193 makes the $1399 TaskMaster the fastest Celeron-366–based PC we've tested, with a level of performance that falls roughly midway between what you'd get with a Pentium II-350 system and a PII-400 system with 64MB of RAM. Unfortunately, many other components can't command such high praise. For starters, the 6.4GB hard drive is small, even by budget PC standards. The Eon Lilith Banshee graphics card uses a 3Dfx Banshee chip—one of the stronger pieces of graphics silicon around—but the board itself hails from a vendor with no established track record. It ports images to a 17-inch Shamrock monitor, which delivers very crisp images marred by somewhat washed-out color.

Micron Millennia C366

The TaskMaster bundles good Altec Lansing ACS295 speakers with a sizable subwoofer. You'll need a screwdriver to remove two small screws; but otherwise, popping open the nondescript midtower case to add components is an easy enough task, and the interior is fairly tidy. Annoyingly, however, Sys does not provide a comprehensive system manual for troubleshooting, although the company does offer users nonstop toll-free support for the first year (after that, support drops to a less impressive nine hours per day) and free on-site service to accompany a three-year warranty on parts (six years on the CPU and main RAM) and five-year coverage for labor.

Sys TaskMaster 366C

14 MICRON MILLENNIA C366

PRO: Lowest price on chart for a Celeron-366 PC

CON: Very limited expansion

The $1279 Micron Millennia C366 may be our chart's least-expensive system equipped with the new Celeron-366 processor, but that's about its only claim to fame. Its PC WorldBench 98 score of 186 puts it in the middle among Celeron-366 PCs with 64MB of RAM.

The Millennia's expansion options are limited to a single open drive bay and two open slots (one PCI and one ISA). Since its sound and graphics chips are integrated onto the motherboard, you'll quickly run out of slots if you ever decide to upgrade sound or graphics. The integrated NVidia RIVA 128zx graphics chip can pump out a much higher resolution ▶

(1920 by 1200 maximum) than the bundled Micron 700VX 17-inch monitor can handle (1280 by 1024). The monitor displayed generally sharp graphics and text but showed some fuzziness in the corners. We found the sound quality from the integrated ESS sound chip and Advent AV009 speakers respectable, though hardly exceptional. Accompanying documentation includes a setup poster and a well-written system manual. Microsoft's Office 97 Small Business Edition comes with the system at this price.

Micron offers a three-year parts warranty (plus five years on the CPU and main RAM) and a one-year labor warranty. The company offers 24-hour toll-free tech support daily. Micron's technical support representatives proved fairly knowledgeable in our recent anonymous calls.

15 MICRO EXPRESS MICROFLEX-4A

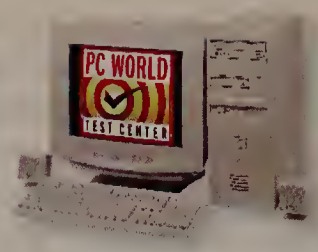
PRO: Good price, nice graphics card

CON: Unimpressive performance, difficult-to-remove case, poor system manual

A little bit of work, a little bit of play. With the Micro Express MicroFlex-4A, you'll get a little bit of everything—from a 5X DVD-ROM drive to a roomy 9.6GB hard drive—for a reasonable $1499. But you won't fly first class at that price. The MicroFlex-4A packs the AMD K6-2-400 chip and earned a PC WorldBench 98 score of 183, equivalent to an average Pentium II-350 system. This is the main reason why the MicroFlex-4A costs $400 less than its fifth-place sibling, the MicroFlex-450A, which has a PII-450 CPU and earned a PC WorldBench 98 score of 221.

MicroFlex-4A

On the outside, the MicroFlex-4A seems identical to the MicroFlex-450A: It has the same beige case, the same color-rich 19-inch Impression monitor, the same Microsoft IntelliMouse, and the same Altec Lansing ACS44 speaker/subwoofer. Inside, they have some differences: their CPUs, their amounts of secondary cache and main memory—the 4A comes with 64MB of RAM versus 128MB for the 450A—and their graphics cards. The MicroFlex-4A's Diamond Monster Fusion card delivers all-around performance, but it's not quite as good or as fast as the 450A's Graphics Blaster RIVA TNT.



American Pro 366

The 4A's case is just as tough to tug off as the 450A's. But when you've done it, you'll find three free card slots, three available drive bays, two free SIMM slots, and two free DIMM slots.

Like the 450A, the MicroFlex-4A is backed with a top-tier support policy, including a four-year warranty on parts and labor. But the same disappointing manual ships with both machines, too. It's woefully out of date, and the illustrations are completely generic and unhelpful.

17 COMPUSA AMERICAN PRO 366

PRO: Great performance for the price, speakers sound quite good

CON: Weak documentation, mediocre support experience in our anonymous calls

The third of four new Celeron-366–based system to make our charts, the $1692 CompUSA American Pro 366, offers a good mix of price and performance. Its PC WorldBench score of 188 pegs its performance at between the levels of a PII-350 system and a PII-400 with 64MB of RAM running on Windows 98.

We found the 17-inch monitor's display to be slightly dark even at maximum brightness, but we were pleased with the quiet and solid keyboard. You need the strength of a stevedore to pry off the case's side cover, but once past it, you'll discover a clean, well-organized interior, with clear access to the slots and bays, and good ventilation. The Cambridge SoundWorks speaker and subwoofer set deliver excellent sound for their compact size. We ordered our test PC bundled with Microsoft's Office 97 Small Business Edition.

The limited system manual is available on screen only; you don't get a printed version at all. CompUSA backs its systems with a three-year warranty on most parts (the monitor is covered for just one year, however) and one year on labor. The vendor's technical support representatives are available by toll-free phone around the clock. In our latest round of anonymous calls to the company's tech support number, however, we had to wait about 15 minutes on average to get through to someone—and their performance was less than sterling. For example, one CompUSA representative told us that the only thing we could do when our keyboard stopped working was to reboot.

19 COMPAQ PROSIGNIA DESKTOP 310

PRO: Good documentation, easy-open case

CON: Mediocre performance, limited expandability

Though aggressively priced at $1399, this midtower from Compaq's Prosignia line represents, at best, a so-so overall value compared to other midrange offerings. It's the slowest of the four new Celeron-366–based systems on the chart, with a PC WorldBench 98 score of 170. That said, however, it should be fast enough to handle all general business tasks.

Prosignia Desktop 310

Using the Desktop 310 proved pleasant enough. The 17-inch monitor accompanying it produced clear, clean, easy-to-read images, and handled 1280-by-1024 resolution—the maximum supported by the unit's Diamond Viper V330 graphics adapter—with aplomb. We also give Compaq high marks for the quality of its documentation, a series of well-written and well-illustrated manuals.

Getting inside the case was a simple matter of removing thumbscrews. Regrettably, the interior houses just one open memory socket, three open slots, and two open drive bays. In our recent anonymous calls to Compaq's technical support, we received courteous and prompt service. ▶

BEYOND THE TOP 20

We evaluated the following system along with the others, but it didn't score high enough to reach the Top 20 Budget Desktops chart. For a write-up, go to PC World Online (www.pcworld.com/t20pcs).

◆ **TigerDirect K-Series Pro-400 3D**

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PC WORLD

TOP 10 NOTEBOOK PCs

	POWER NOTEBOOK	Last month	Month tested	Street price (1/15/99)	CPU	Comments
1	Gateway Solo 5150LS 800/315-2536 www.gateway.com	n/a	NEW	$3134	Pentium II-366	Desktop replacement unit sports a big 14.1-inch screen and DVD-ROM drive.
2	Dell Latitude CPi D300XT 800/388-8542 www.dell.com	1	Nov 98	$3148	Pentium II-300	Thin, light laptop with great keyboard for travel and desktop work.
3	Dell Inspiron 7000 A366LT 800/388-8542 www.dell.com	n/a	NEW	$3549	Pentium II-366	Very heavy notebook with huge 15-inch screen sets new speed record.
4	NEC Versa SX 888/863-2669 www.nec-computers.com	5	Dec 98	$3099	Pentium II-300	$600 off thin, very light model; good for travel except for poor battery life.
5	Toshiba Tecra 8000 800/867-4422 www.toshiba.com	4	Nov 98	$3099	Pentium II-266	Lightweight travel notebook with good performance has lackluster battery.
	BUDGET NOTEBOOK					
1	Dell Inspiron 3500 C300XT 800/388-8542 www.dell.com	n/a	NEW	$2229	Celeron-300	New Best Buy is powerful, light enough for travel, and reasonably priced.
2	Gateway Solo 2500SE 800/315-2536 www.gateway.com	n/a	NEW	$1974	Celeron-266	Outstanding 5-plus hours of battery life sets 8.1-pound notebook apart.
3	Toshiba Satellite 4015CDS 800/867-4422 www.toshiba.com	n/a	Feb 99	$1599	Pentium II-266	$200 off notebook with good performance and battery life, dual-scan screen.
4	NEC Versa Note 888/863-2669 www.nec-computers.com	n/a	NEW	$1899	Pentium II-233	Very affordable thin-and-light travel model; battery could be stronger.
5	AMS Tech Roadster 15CTA 800/886-2671 www.amstech.com	4	Jan 99	$1295	AMD K6-2-300	$100 off cheapest notebook on chart; has bright screen, three-year warranty.

Best Buy See features chart, page 240.

n/a = not applicable

[1]Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive.

[2]For more about products here, select the number on the product information card or visit www.pcworld.com/productinfo.

[3]Insufficient data to give a rating.

FOR MANY NOTEBOOK BUYERS, the elements you see—screen, pointing device, even case color—play as big a part in the purchase decision as the system's innards. But due to some recent changes in chip technology, notebook buyers should rethink their assessment strategies. You'll want to pay more attention to a candidate's CPU, because Intel has recently released six promising chips (four mobile Pentium IIs and two mobile Celerons) for power and budget portables.

This month, notebooks running on three of these new mobile processors proved their mettle by claiming nearly half the slots on the Top 10 chart, including both the power and budget Best Buys. Intel's new mobile chips go faster because they incorporate the secondary cache instead of placing it outside the CPU, as regular Pentium chips do. The new processors give older models new life. Gateway's Solo 5150LS, for example, languished below our Top 10 radar when we tested the PII-300 version in February. Upgraded with a mobile Pentium II-366, Intel's new top-of-the-line mobile processor, the $3134 5150LS takes our power chart by storm, outperforming its PII-300 counterpart by a whopping 21 percent for only $85 more.

On the budget side, Intel's new notebook-optimized Celeron chips rule. Like newer Pentium II processors, the mobile Celeron chips integrate the secondary cache on board (though the PIIs provide twice as much secondary cache—256KB versus 128KB). Dell's $2229 Inspiron 3500 C300XT, our new budget Best Buy, and Gateway's $1974 Solo 2500SE, the new second-place budget machine, carry Celeron-300 and -266 CPUs, respectively. These systems cost hundreds of dollars less than their Pentium II-266 and -300 predecessors and perform just as ably.

This Month's Best Buys

POWER NOTEBOOKS

1 GATEWAY SOLO 5150LS

PRO: Second fastest notebook tested, versatile modular bay, huge screen

CON: On the heavy side of average, can't use two batteries at once

What a difference a chip makes. Thanks to a new Pentium II-366 processor, Gateway's Solo 5150LS rockets into first place on the power chart. With a performance jump of more than 20 percent over the PII-300 version of the notebook, and a price increase of less than $100, this desktop replacement stands out as a terrific presentation machine.

It's not the fastest notebook we've tested (another PII-366, Dell's Inspiron 7000 A366LT, claims that honor with a PC WorldBench 98 score of 191), but the 5150LS comes close, with a score of 186.

The $3134 5150LS has all the software, hardware, and accessories you'll need to

SCORECARD

★ Overall rating	PC WorldBench 98 score/performance	Price	Vendor's system reliability	Features and design	Vendor's support quality/policies	Battery life (hours:min)/rating	Traveling weight [1]	Product Info number [2]
88	186/outstanding	average	good	very good	good/fair	2:50/good	average	679
86	159/very good	average	good	good	good/good	3:05/good	average	–
86	191/outstanding	average	good	very good	good/fair	3:24/good	unacceptable	–
85	157/very good	average	good	very good	fair/best	1:25/poor	very light	680
84	154/good	average	good	good	good/fair	2:42/satisfactory	light	681
Power scorecard weightings ▶	Performance 22 percent	Price 14 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	
89	160/outstanding	average	good	very good	good/good	2:45/satisfactory	light	–
89	149/very good	average	good	very good	good/fair	5:06/outstanding	heavy	682
87	130/good	very inexpensive	good	good	good/fair	3:06/good	average	683
86	128/good	inexpensive	good	good	fair/good	2:37/satisfactory	light	684
85	122/satisfactory	very inexpensive	[3]	good	good [4]/fair	2:35/satisfactory	average	685
Budget scorecard weightings ▶	Performance 14 percent	Price 22 percent	Reliability 22 percent	Features 16 percent	Support 10 percent	Battery life 8 percent	Weight 8 percent	All products: 907

[4] Due to insufficient data from survey, score is based on responses to anonymous calls for tech support.

compute in style in the office or at home; a copy of Microsoft Office 97 Small Business Edition comes preinstalled. For making big, colorful presentations or watching movies, the notebook pairs a sharp 14.1-inch screen with a DVD-ROM drive and an MPEG-2 decoder card. Move the 5150LS into the living room, and you can use the built-in TV jack to port DVD movies to a bigger screen (though you'll have to buy your own cable).

As a travel notebook, the 5150LS rates about a C. It lists toward the heavy side of average, at 7.7 pounds (including AC adapter and DVD-ROM drive). You may find the PC Card modem inconvenient to use on the road—assuming that you remember to bring it at all. And you can't install two batteries at once.

The 5150LS's 2 hours and 50 minutes of battery life earn a score of good, though just barely. The square black case measures only 1.6 inches thick—slightly slimmer than the usual size. And Gateway throws in a handsome leather carrying case.

Gateway's Solo 5150LS has a helpful rocker switch.

If you're concerned about upgrading down the road, relax. The 5150LS's front-mounted modular bay can accommodate an extra-cost LS-120 removable-media drive or a second hard drive, in place of the included DVD-ROM or floppy drive. (Unfortunately, you can't share any of the modular-bay devices with other Gateway notebooks, because the bays aren't cross-compatible.) By the time you read this, a 10GB primary hard drive upgrade option will be available. When USB peripherals become more common, you'll be ready—the 5150LS sports two connections.

Gateway's standard parts warranty runs for only one year. Otherwise, the company competes with Dell for leader-of-the-pack honors in breadth of support. You get knowledgeable, friendly, toll-free, around-the-clock telephone support for as long as you own the notebook.

BUDGET NOTEBOOKS

1 DELL INSPIRON 3500 C300XT

PRO: Modular bay accepts various devices, Dell's support and notebook reliability rank among the best, AGP graphics bus for peppy presentations

CON: Awkwardly placed AC adapter jack

Looking for a high-quality business notebook at a moderate price? At $2229, Dell's Inspiron 3500 C300XT could be the answer, especially if you've been waiting for Pentium II-300 prices to drop to earth.

The C300XT—the first portable we've tested that runs on Intel's new Celeron-300 chip—gives you PII-300 speed and expansion options that only a month or two ago would have cost hundreds of dollars more. Factor in its 4GB hard drive, 13.3-inch active-matrix screen, 1.5-inch-thick case, and 7.3-pound traveling weight (including AC adapter and CD-ROM drive), and you'll understand why this multimedia portable sidles past Gateway's Celeron-266–based Solo 2500SE and into the top spot on our budget chart. ▶

TOP 10 NOTEBOOK PCs — STANDARD FEATURES

	POWER NOTEBOOK	CPU	Traveling weight (pounds)[1]	RAM (MB)	Hard drive (GB)	Color screen type	Screen diagonal (inches)	Screen resolution	Maximum screen colors	Battery type	Pointing device
1	Gateway Solo 5150LS*	Pentium II-366	7.7	64	6.4	active	14.1	1024 x 768	16.8 million	lithium ion	touchpad
2	Dell Latitude CPi D300XT	Pentium II-300	7.4	64	6.4	active	13.3	1024 x 768	262,144	lithium ion	touchpad
3	Dell Inspiron 7000 A366LT	Pentium II-366	10.4	64	8.1	active	15	1024 x 768	16.8 million	lithium ion	touchpad
4	NEC Versa SX	Pentium II-300	6.4	64	4	active	14.1	1024 x 768	65,536	lithium ion	touchpad
5	Toshiba Tecra 8000	Pentium II-266	7.2	64	6.4	active	13.3	1024 x 768	262,144	lithium ion	eraserhead
	BUDGET NOTEBOOK										
1	Dell Inspiron 3500 C300XT*	Celeron-300	7.3	64	4	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
2	Gateway Solo 2500SE	Celeron-266	8.1	64	6.4	active	12.1	800 x 600	16.8 million	lithium ion	touchpad
3	Toshiba Satellite 4015CDS	Pentium II-266	7.7	32	4.1	dual-scan	12.1	800 x 600	16.8 million	lithium ion	eraserhead
4	NEC Versa Note	Pentium II-233	7	32	3.2	active	13.3	1024 x 768	16.8 million	lithium ion	touchpad
5	AMS Tech Roadster 15CTA	AMD K6-2-300	7.9	32	2.1	active	12.1	800 x 600	16.8 million	NiMh	touchpad

*Best Buy ● Yes ○ No [1]Includes computer; adapter; power cord; and floppy, DVD-ROM, or CD-ROM drive. [2]One year on battery.

Because Celeron chips contain only 128KB of onboard cache—half as much as Intel's other new CPUs—the C300XT lags behind some new higher-end notebooks we tested. It trails Hewlett-Packard's OmniBook 900, a Pentium II-300PE–based notebook, by about 5 percent. But this Inspiron's PC WorldBench 98 score of 160 beats the average PII-300's score by a point or two, and its price falls hundreds of dollars below the median for PII-300s.

Inspiron 3500 C300XT

Compared to its bigger sibling—the 10.4-pound, $3549 Inspiron 7000 A366LT (see "New This Month")—the C300XT makes a better choice for the average business traveler or budget buyer. It's much thinner, lighter, and cheaper than its behemoth kin. And although the larger Inspiron has a longer battery life, the C300XT endured for a tolerable 2 hours and 45 minutes in our tests.

The notebook's modular bay can accept any of several extra-cost add-ins, including a second battery, a DVD-ROM drive, or a Zip drive. The bundled floppy drive and 10X–24X CD-ROM drive share the same bay. Only the location of the AC adapter connection, which Dell decided to group with all the audio jacks on the right side instead of situating in back, struck us as an unwise design choice.

The C300XT boasts a comfortable keyboard that's a scant fraction of an inch wider than average, and the included Synaptics utility lets you program the buttons to launch applications. Dell provides beautiful manuals, and the company's generous support includes around-the-clock toll-free phone lines and three-year warranties on parts and labor.

New This Month

POWER NOTEBOOKS

1 DELL INSPIRON 7000 A366LT

PRO: Fastest notebook we've tested, panoramic screen, huge hard drive, DVD-ROM drive

CON: Too heavy, poor audio

Notebooks don't get faster—or more leaden than the Dell Inspiron 7000 A366LT. This PII-366–equipped, all-in-one desktop replacement has the power to be your multimedia workhorse, if you have the back to be its pack mule.

Intel's fastest mobile CPU and 256KB of onboard secondary cache help the A366LT earn a PC WorldBench 98 score of 191, the highest we've ever recorded for a notebook. Resplendent with a scintillating 15-inch screen and a $129 optional port replicator from Dell, the A366LT would be ideal as a primary work PC.

Inspiron 7000 A366LT's stacked media drive

But despite its laudable 3.4-hour battery life, you won't want to drag this unit far from work. Denting the scales at a groan-worthy 10.4 pounds and measuring 12.9 inches by 10 inches by 2.2 inches, the A366LT does a good imitation of a ball and chain. The notebook also suffers from anemic built-in audio.

Much of the A366LT's thickness is due to its 17mm-high 8.1GB hard drive, the tallest we've yet seen in a Top 10 notebook. Huge hard drives won't be available in the standard 12mm height for a while.

The A366LT accepts the same add-in devices in its modular bay as does its lighter sibling, the Inspiron 3500, but it stacks the DVD-ROM and floppy drives in a single combined unit, which increases the notebook's height further. A CD-ROM/floppy drive version of the notebook costs $199 less.

		EXPANDABILITY					CUSTOMER SUPPORT			
CD/DVD-ROM drive speed	56-kbps modem protocol	Maximum RAM (MB)	Modular expansion bays	Bay for second battery	Optional docking station	Infrared port	Warranty for parts/labor (years)	Weekday toll-free support (hours)	Weekend support	Online support
2X DVD	V.90	288	1	○	●	●	1/1	24	Sat, Sun	AOL, BBS, CIS, WWW
12X-24X	not included	128	1	●	●	●	3/1	24	Sat, Sun	BBS, WWW
2X DVD	V.90	192	2	●	●	●	3/3	24	Sat, Sun	BBS, WWW
10X-24X	x2	256	1	●	●	●	3/3	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
12X-24X	V.90	256	1	○	●	●	3 2/3	24	Sat, Sun	BBS, CIS, WWW
10X-24X	V.90	256	1	●	●	●	3/3	24	Sat, Sun	BBS, WWW
8X-20X	V.90	2BB	0	○	●	●	1/1	24	Sat, Sun	AOL, BBS, CIS, WWW
12X-24X	V.90	160	0	○	○	●	1/1	24	Sat, Sun	BBS, CIS, WWW
12X-24X	V.90	12B	0	○	○	●	1/1	24	Sat, Sun	AOL, BBS, CIS, MSN, WWW
10X-24X	K56flex	96	0	○	○	●	3/3	11	none	BBS, CIS, WWW

BUDGET NOTEBOOKS

2 GATEWAY SOLO 2500SE

PRO: Super battery, great sound, software extras

CON: Boxy looking, on the heavy side

What its plain exterior lacks in éclat, the $1974 Gateway Solo 2500SE repays in value. Consumers, small-business owners, and corporate buyers should take a look at this 8.1-pound Celeron-266–driven system with built-in CD-ROM and floppy drives.

Equipped with the slowest of Intel's new CPUs, the 2500SE earned a PC WorldBench 98 score of 149, trailing the average PII-366 by 26 percent. Still, it outperforms an average Pentium II-266 notebook by a whisker and costs about $500 less.

The 2500SE's price impresses us even more considering what's included: You get a 6.4GB hard drive, a TV-out jack, and a clutch of home-office applications.

The 2500SE cannot hold two batteries at once, but you probably won't care: its big 12-cell battery (as opposed to the usual 9-cell unit) soldiers on for better than 5 hours, twice what many other notebooks manage. Audio is a blast, literally: The 2500SE's speakers are among the loudest and most resonant we've heard.

Gateway Solo 2500SE

If you prefer eraserhead-style pointing devices, you can bypass the standard touchpad. Similarly you can ditch the standard floppy drive for a fixed SuperDisk LS-120 removable-media drive, and spurn the CD-ROM drive for a DVD-ROM drive.

Gateway expects to be selling a Celeron-300 version of this notebook for the same price by April. Be on the lookout.

4 NEC VERSA NOTE

PRO: Fairly light, good reliability ratings for NEC

CON: Feeble sound, user can't upgrade hard drive

A svelte successor to notebooks in NEC's 2700 series, the Windows 95–equipped Versa Note makes a fine portable for first-time buyers. Its $1899 sticker price keeps your budget in the black, and its Pentium II-233 CPU runs basic apps without a hitch. The Versa Note turned in a PC WorldBench 98 score of 128—average for a notebook with its processor.

NEC designed the Versa Note with travel in mind. At 1.5 inches thick and 7 pounds, it's a bit trimmer and lighter than a traditional notebook. But make your trips short: The Versa Note's battery lasted little more than 2.5 hours, earning only a satisfactory rating, and you can't install two batteries at once.

NEC Versa Note

A $129 port replicator gives the Versa Note flexibility as a desktop replacement. And with its 13.3-inch active matrix screen, you may not need to bring in an external monitor.

The NEC's silver upper casing contrasts fetchingly with its dark-gray base. The keyboard's keys felt pleasantly springy but a bit fragile. Another negative: The Versa Note's drives—floppy, 12X–24X CD-ROM, and 3.2GB hard disk—are all fixed, limiting your upgrade options.

—*Carla Thornton*

Contributing Editor Carla Thornton writes regularly about notebooks. ■

BEYOND THE TOP 10

Following is a list of other models that we evaluated this month but that did not score high enough to make the Top 10 Notebook PCs chart. For reviews of these systems, visit PC World Online (www.pcworld.com/top400).

- **CTX EZBook V92C266**
- **HP OmniBook 900**
- **Toshiba Portégé 7000CT**

PC WORLD

TOP 10 HOME PCs

	POWER SYSTEM	Last month	Month tested	Street price (1/15/99)	Comments
1	Dell Dimension XPS T500 800/388-8542 www.dell.com	n/a	NEW	$2449	PRO: Fastest home system to date, great price for Pentium III, easy setup, includes Zip drive. CON: Limited software package, mediocre support rating.
2	Micron Millennia 450 Max 800/642-7667 www.micronpc.com	2	Dec 98	$2550	PRO: Very fast, comes with SideWinder joystick, PC Pro Game Pad, and Zip drive. CON: Pricey, so-so range of software.
3	Gateway G6-500 800/315-2536 www.gateway.com	n/a	NEW	$2639	PRO: Extremely fast, top graphics scores, outstanding sound system. CON: Very expensive.
4	Sony PCV-E308DS 800/315-7669 www.sony.com/pc	4	Jan 99	$2400	PRO: $100 price cut, supereasy setup, tons of digital imaging software, FireWire. CON: Poor upgradability.
5	Compaq Presario 5600 800/345-1518 www.compaq.com	3	Dec 98	$2499	PRO: Impressive speed, includes accelerator card, built-in ethernet, DSL capability, and FireWire. CON: Average reliability and service scores.
	BUDGET SYSTEM				
1	CyberMax Enthusiast KII-350 800/346-6685 www.cybermaxpc.com	n/a	NEW	$1099	PRO: Excellent price, big monitor, very fast, great selection of software titles. CON: Inferior 3D performance in graphics test, confusing controls on monitor.
2	Quantex QP6/333 M-1c 800/896-4898 www.quantex.com	2	Feb 99	$1049	PRO: Fast; great price, especially for a Celeron-333 system. CON: Limited software package, flimsy keyboard, small monitor.
3	Compaq Presario 2266 800/345-1518 www.compaq.com	4	Jan 99	$848	PRO: Cheapest machine on chart, decent speed for the price. CON: Poor graphics performance, not suitable for games.
4	Micron Millennia 350 800/642-7667 www.micronpc.com	5	Dec 98	$1451	PRO: Fast, solid reliability and service ratings. CON: Most expensive budget PC on chart despite recent $198 price drop.
5	IDot.com Family System 2 888/388-4368 www.idot.com	n/a	NEW	$1299	PRO: Great speed, good graphics, terrific value, includes Lexmark 1100 printer. CON: Lesser-known manufacturer.

Best Buy n/a = not applicable Recommended as gaming system

[1] For more about products here, select the number on the product information card or visit www.pcworld.com/productInfo.

HOW DO YOU SATISFY a *serious* need for speed? Car enthusiasts can shell out a hundred thousand dollars for a Ferrari Testarossa. For the money, they get superlative speed *and* a great long-term investment. Too bad cutting-edge PCs don't hold their value in the same way. The premium you pay for the latest, greatest machine today buys only a month or two of bragging rights. But as this month's Top 10 chart shows, at least today you pay less for the best.

Two years ago, you'd have had to spend over $3000 for a computer combining the hottest processor (a Pentium Pro-200), loads of RAM (32MB), and a nearly inexhaustible 3.2GB hard disk. No longer. This month, Intel's Pentium III processor debuts on the power chart in 500-MHz machines from Dell and Gateway.

Dell's new Dimension XPS T500 grabs the Best Buy baton from March's number one, the Dimension XPS R450 (which it replaces). Gateway's new G6-500, meanwhile, finishes third. Both machines run at 500 MHz, have big hard disks by today's standards, and cost less than $2700.

On the budget side, we tested four freshly released systems, and two of them rang up high enough overall scores to crack the chart: CyberMax's Enthusiast KII-350—our new number one—and newcomer IDot.com's Family System 2. As IBM's hot-selling Aptiva D1N—last month's Best Buy—flies off computer store shelves, Big Blue promises to have a comparable replacement on the market soon. As we went to press, no further information was available from IBM.

Dell Dimension XPS T500

MMX ON STEROIDS

FOR HOME USERS, especially gamers, the Pentium III chip promises significant acceleration in graphics performance on new software, much as MMX stepped up the original Pentium. Of course, like MMX during its early days, PIII today is a chip in search of optimized software to run—at first, only a handful of software packages will actually take advantage of the new technology. With the Pentium III chip, the biggest performance boosts will occur in 3D graphics, making the new chip most attractive to high-end gamers.

If you're on the prowl for a fast system, you'll like both of this month's power chart newcomers. The Dell Dimension XPS T500 bolted to a new speed record—a PC WorldBench 98 score of 231. It also earned the third-highest score ever on our 3D graphics and multimedia tests, probably due more to its zippy STB Velocity 4400 graphics card with 16MB of RAM than to the CPU's graphics enhancements.

The XPS T500's $2449 price includes a spacious 12.9GB hard drive, a built-in Zip

SCORECARD

★ Overall rating	PC WorldBench 98 score/rating	Price	Setup/ ease of use	Graphics	Reliability/ support	Features	Product info number
87	231/outstanding	expensive	outstanding/ outstanding	outstanding	outstanding/ fair	Pentium III-500, 128MB of SDRAM, 12.9GB hard drive, 2X DVD-ROM drive, V.90 56-kbps modem, 17-inch monitor, Turtle Beach Montego sound card.	–
86	221/outstanding	very expensive	very good/ good	outstanding	good/ good	Pentium II-450, 128MB of SDRAM, 14.4GB hard drive, 2X DVD-ROM drive, x2 56-kbps modem, 19-inch monitor, joystick, game pad.	613
82	229/outstanding	very expensive	outstanding/ good	outstanding	fair/ good	Pentium III-500, 64MB of RAM, 13.6GB hard drive, 2X DVD-ROM drive, V.90 56-kbps modem, 19-inch monitor, Boston Acoustics BA635 speakers.	614
82	201/good	expensive	outstanding/ good	outstanding	good/ good	Pentium II-450, 128MB of SDRAM, 10GB hard disk, 2X DVD-ROM drive, x2 56-kbps modem, 17-inch monitor.	615
82	216/outstanding	expensive	outstanding/ good	outstanding	fair/ fair	Pentium II-450, 128MB of SDRAM, 12.9GB hard drive, 2X DVD-ROM drive, V.90 56-kbps modem, 19-inch monitor, built-in ethernet.	616
Power scorecard weightings ▶	Performance 20 percent	Price 10 percent	Setup/ease 5 percent	Graphics 10 percent	R & S 40 percent	Features 15 percent	
80	161/very good	inexpensive	good/ good	fair	good/ good	AMD K6-2-350, 64MB of SDRAM, 6.4GB hard disk, 2X DVD-ROM drive, V.90 56-kbps modem, 19-inch monitor.	617
79	169/very good	inexpensive	good/ fair	good	good/ good	Celeron-333, 64MB of SDRAM, 4GB hard disk, 12X-32X CD-ROM drive, V.90 56-kbps modem, 15-inch monitor.	618
75	130/fair	very inexpensive	good/ fair	poor	fair/ fair	IBM 6xB6MX-PR300, 64MB of SDRAM, 3GB hard drive, 12X-32X CD-ROM drive, V.90 56-kbps modem, 15-inch monitor.	619
74	178/outstanding	expensive	very good/ good	good	good/ good	Pentium II-350, 64MB of SDRAM, 8.4GB hard drive, 16X-40X CD-ROM drive, x2 56-kbps modem, 17-inch monitor.	620
73	177/outstanding	average	good/ very good	good	[2]	AMD K6-2-350, 64MB of SDRAM, 6.4GB hard disk, 17X-40X CD-ROM drive, V.90 56-kbps modem, Lexmark 1100 color ink jet printer, 17-inch monitor.	686
Budget scorecard weightings ▶	Performance 15 percent	Price 25 percent	Setup/ease 10 percent	Graphics 5 percent	R & S 40 percent	Features 5 percent	All products: 901

[2] Insufficient data to give a rating.

drive, and Microsoft Works Suite 99. The two free external expansion bays and two free internal DIMM slots for RAM are easy to reach. But the case's metal crossbar hampers access to one of the system's two free PCI slots.

CyberMax Enthusiast

Gateway's PIII entry, the $2639 G6-500, is negligibly slower than the Dell system on business apps, earning a PC WorldBench 98 score of 229. Thanks to its own STB Velocity 4400 graphics card with 16MB of RAM, it posted terrific graphics ratings.

The G6-500 also has great growth potential. An easy-to-open cover pops off to reveal five free PCI slots (but no ISA slots—so forget about adding older cards) and four free expansion bays, all easy to access.

LOW-PRICE BUDGET DEALS

BRAND-NEW AT THE TOP of the budget chart is CyberMax's Enthusiast KII-350. The value-priced $1099 KII-350 comes with a DVD-ROM drive and Altec Lansing ACS45 speakers that deliver above-average sound. Plus, it's backed by the company's solid reliability and service record.

The KII-350's PC WorldBench 98 score of 161 puts it on a par with a typical Pentium II-300 PC, but game enthusiasts should note that the KII-350 showed little zest for handling demanding graphics applications.

Finally, a system from IDot.com, a lesser-known company that sells its PCs exclusively on the Web, grabs the fifth budget slot this month. At $1299, IDot.com's new Family System 2 constitutes an excellent value, especially since the package includes Lexmark's 1100 Color Jet printer. The Family System 2 is easy to set up, too—cables and connectors are clearly marked and well documented. The Family System 2 has a solid case with a well-designed easy-off panel and plenty of free expansion slots and open bays.

The system also performed impressively. The K6-2-350 CPU helped it scamper to a PC WorldBench 98 score of 177 (Pentium II-333 level). Throw in Altec Lansing ACS43W speakers and Corel WordPerfect Suite 8, and you have a winner. We lack reliability and service data for IDot.com, but we judged its tech support quality to be average, following our anonymous calls to its support line: The reps supplied us with good but brief advice, and our longest hold time was almost 15 minutes.

—*Kirk Steers*

Kirk Steers is a contributing editor for PC World. *Testing performed by Ulrike Diehlmann of the PC World Test Center.* ■

BEYOND THE TOP 10

online

We also evaluated the following systems this month, but they did not score high enough to make the *Top 10 Home PCs* list. For reviews, see PC World Online (www.pcworld.com/t10homepcs).

- **Axis Computer 100M-Pro PII-450**
- **Gateway G6-400**
- **Kingdom Pinnacle 450**
- **NexTrend NexStar 5182**
- **Quantex QP6/350 M-1x**

Does it really make sense to insist on the quality of the PC, but not the reliability of the connection?

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PC WORLD

TOP 10 PRINTERS

	SMALL-BUSINESS/HOME COLOR	Street price (2/1/99)	Overall rating	Speed for plain text/full-page graphics (ppm)	Print quality for text/color graphics	Comments	Product info number
1	Canon BJC-5000 800/652-2666 www.ccsi.canon.com	$199	84	2.3/0.4	good/ adequate	**FEATURES:** Ink jet, rated 7.5 ppm monochrome/3 ppm color. 1440-by-720-dpi maximum resolution, 130 sheets input and output. **SUMMARY:** Another price drop ($30) for this Best Buy, good text quality, and top-notch paper-handling options (including sheets up to 11 by 17 inches) offset below-average speeds.	621
2	Epson Stylus Photo 700 800/463-7766 www.epson.com	$249	81	1.3/0.4	adequate/ good	**FEATURES:** Ink jet, speed unrated. 1440-by-720-dpi maximum resolution, 100 sheets input, 30 output. **SUMMARY:** Good graphics print quality on plain paper—and outstanding photo quality on specialty media—but text speed is the slowest on the chart. Comes with a strong photo-oriented software bundle.	–
3	Lexmark 3200 Color Jetprinter 800/539-6275 www.lexmark.com	$179	81	2.1/0.4	good/ good	**FEATURES:** Ink jet, rated 6 ppm monochrome/2.5 ppm color. 1200-by-1200-dpi maximum resolution, 100 sheets input, 25 output. **SUMMARY:** Solid print quality for a good price, and Lexmark now offers a money-back guarantee, but performance is somewhat slow. The number four 5700 Color Jetprinter offers more features but costs $70 more.	622
4	Lexmark 5700 Color Jetprinter 800/539-6275 www.lexmark.com	$249	80	2.9/0.3	good/ good	**FEATURES:** Ink jet, rated 8 ppm monochrome/4 ppm color. 1200-by-1200-dpi maximum resolution, 100 sheets input, 25 output. **SUMMARY:** Slightly faster on text than the Canon BJC-5000, but costs $50 more. Now features a 30-day money-back guarantee. Its features are more comprehensive than the number three 3200 Color Jetprinter's.	623
5	Canon BJC-4400 800/652-2666 www.ccsi.canon.com	$149	79	2.1/0.4	adequate/ adequate	**FEATURES:** Ink jet, rated 6.5 ppm monochrome/2.5 ppm color. 720-by-360-dpi maximum resolution, 100 sheets input and output. **SUMMARY:** A fine printer for an incredibly low price. Good paper-handling capabilities help compensate for slow page generation speeds and middling (but still adequate) print quality.	624
6	Epson Stylus Color 1520 800/463-7766 www.epson.com	$499	78	3.3/1.2	good/ good	**FEATURES:** Ink jet, rated 6 ppm monochrome/5 ppm color. 1440-by-720-dpi maximum resolution, 100 sheets input, 35 output. **SUMMARY:** Good choice if you need wide-format printing—on sheets up to 13 by 19 inches. Decent print quality at default settings, and outstanding output at special settings on ink jet stock.	–
7	Epson Stylus Color 440 (NEW) 800/463-7766 www.epson.com	$149	77	2/0.6	good/ adequate	**FEATURES:** Ink jet, rated 4 ppm monochrome/2.5 ppm color. 720-by-720-dpi maximum resolution, 100 sheets input, 30 output. **SUMMARY:** A new challenger to the Canon BJC-4400, this equally inexpensive model prints slightly better text more slowly, and similar graphics more quickly. Home users will appreciate the fun CD-ROM bundle.	–
	CORPORATE COLOR						
1	Tektronix Phaser 740/N (NEW) 800/835-6100 www.tek.com	$1850	88	8.9/0.5	good/ adequate	**FEATURES:** Laser, rated 16 ppm monochrome/5 ppm color. Standard 32MB of RAM, 1200-by-1200-dpi maximum monochrome/600-by-600-dpi maximum color resolution, 350 sheets input, 500 output. **SUMMARY:** You can upgrade this quick, cheap new laser to include even more features. Strong text quality, but graphics can be inconsistent.	625
2	Lexmark Optra SC 1275 800/539-6275 www.lexmark.com	$2149	87	7.5/0.5	good/ good	**FEATURES:** Laser, rated 12 ppm monochrome/3 ppm color. Standard 16MB of RAM, 600-by-600-dpi maximum resolutions, 400 sheets input, 250 output. **SUMMARY:** This great choice for busy offices features strong print speeds, extensive paper-handling options, good all-around print quality, and an easy-to-use design.	626
3	Tally T8104 800/843-1347 www.tally.com	$2429	84	9.8/0.5	good/ good	**FEATURES:** Laser, rated 16 ppm monochrome/8 ppm color. Standard 24MB of RAM, 1200-by-600-dpi maximum resolutions, 250 sheets input and output. **SUMMARY:** Fastest text speed on the chart and good print quality make this model a contender. Its price, though reasonable, is still the highest among this group.	627

Best Buy · Recommended for home · Windows 95-certified Plug and Play · All products: 902

TEST PC WORLD CENTER

HOW WE TEST The overall rating for both small-business/home and corporate printers is based on print quality (25 percent), price (25 percent), features (15 percent), speed (10 percent), service and support (10 percent), and ease of use (15 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

FOLKS IN THE KNOW say that marketing is war, and the color printer market has indeed come to resemble a war zone. Two new low-cost models battle for our corporate Best Buy, with Tektronix's $1850 Phaser 740/N prevailing. The other, an even cheaper model from QMS, misses the chart. At $1300, the Magicolor 2 DeskLaser is astoundingly affordable for a color laser, but design compromises make it a weak choice for some offices. ▶

Two other newcomers also fall short: Canon's CLBP 460 PS and Hewlett-Packard's Color LaserJet 4500 offer decent performance and features, but their prices—$3000 and $2500, respectively—hail from an earlier era.

On the home front, the Canon BJC-5000 remains our Best Buy, while Epson's new $149 Stylus Color 440 squeaks onto the chart. HP's $149 DeskJet 697 doesn't make the cut.

COLOR CONUNDRUMS

THERE ARE MANY REASONS to choose a color laser over a networkable and comparatively fast ink jet, but until recently, price wasn't one of them. Now QMS attacks this last barrier: At $1300, its Magicolor 2 DeskLaser costs little more than a high-speed, networked ink jet such as Hewlett Packard's $1199 2000CN. But the DeskLaser doesn't include some typical laser advantages. It lacks the PostScript page description language (handy for offices working on multiple platforms); you can't increase its 8MB memory unless you first replace the main circuit board (for $1300 extra) and buy extra RAM; and it prints text at a poky 3.3 pages per minute, much slower than most of its color laser competitors. (Its 1.1-ppm graphics speed is strong.) The DeskLaser prints crisp text, and clean—if pale—graphics. But its good print quality is not enough to overcome its design weaknesses.

Tektronix's Phaser 740/N suffers none of the DeskLaser's limitations. PostScript comes standard. Its speed—8.9 ppm on text and 0.5 ppm on graphics—is on a par with that of other color lasers. It supports an optional $695 paper-handling subsystem that includes a duplexer and two extra 250-sheet paper trays, and increasing its 32MB of memory enables support for additional capabilities such as 1200-dpi printing. Our one criticism of the 740/N is its uneven print quality. The printer performs well on text but produces heavy, dark color graphics.

Canon's CLBP 460 PS and HP's Color LaserJet 4500, two newcomers that missed the chart, use an identical Canon engine. The HP is the better option of the two. The printers produce similar, adequate output, with dark blacks that shroud gray-scale graphics and add a shadow to text. Curiously, the HP turns out smooth, realistic color graphics, while the Canon's color displays a cyan cast and somewhat blocky textures. The HP also prints text and graphics faster than the Canon, and Canon charges $500 more than HP. The HP also has crystal-clear control panel menus; Canon's are confusing.

ON THE INK JET FRONT

LOW-END INK JETS seem to be improving. In February, Canon cut the price on its BJC-4400 to $149, making that model the first adequate sub-$150 color printer.

BLASTING INTO FIRST PLACE, the new Tektronix Phaser 740/N offers strong features and quick speeds for just $1850.

Now the BJC-4400 has a companion in Epson's identically priced Stylus Color 440, which lands in seventh place on our small-business/home chart. The Epson nearly matches the Canon in text speed at 2 pages per minute, and it beats the Canon by half on graphics, at 0.6 ppm. The Epson's print quality isn't bad for the price: Text looks okay but slightly fuzzy; color graphics are adequate—a bit flat, but with reasonably subtle shading and transitions. Epson packs the Stylus Color 440 with Adobe's PhotoDeluxe and American Greetings' CreataCard and StickerPix Lite.

We also tested a new HP ink jet, the DeskJet 697. Though sharing that same low $149 price, the 697's print quality—shadowy text with jagged edges and fuzzy, dotty color—doesn't match what's offered by the identically priced printers on our chart from Canon and Epson.

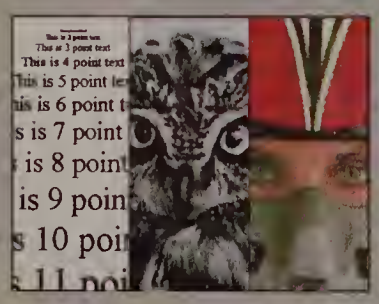
LAST INK

WHEN A FORMER BEST BUY slips from the top spot, the reason can be an outdated driver. But with Lexmark's 5700 Color Jetprinter, now at number four, that's not the case. We retested the 5700 with the company's new driver and saw no change in performance—a zippy 2.9 pages per minute on text and a poky 0.3 on graphics. The Jetprinter's print quality also remains good all around. The 5700 was a high-quality ink jet when it hit the top of our chart last year, and it still is. But its $249 price has become less of a deal.

—*Dan Littman* ■

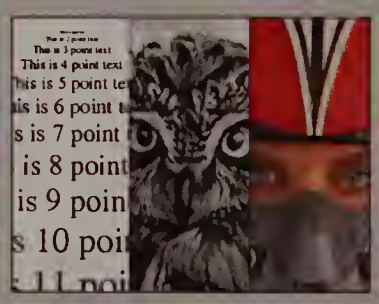
PRINT QUALITY SAMPLES

Color Printers Come in All Prices



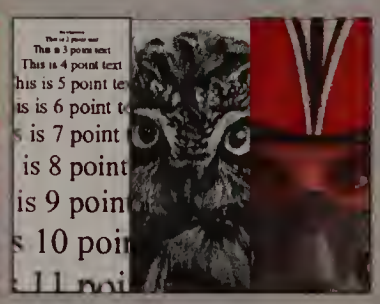
EPSON STYLUS COLOR 440

For $149, the Epson delivers competent print quality. Text is a bit fuzzy but readable, while grays and colors are what you'd expect: grainy, but with smooth transitions.



HP COLOR LASERJET 4500

Rich black text shows annoying shadows on this $2500 also-ran, and grays print much too dark. Too bad, since the HP produces vivid, detailed color.



TEKTRONIX PHASER 740/N

Our new corporate Best Buy, the $1850 Tektronix Phaser 740/N, produces clear text and even, realistic gray-scale images, but its overly dark color loses some detail.

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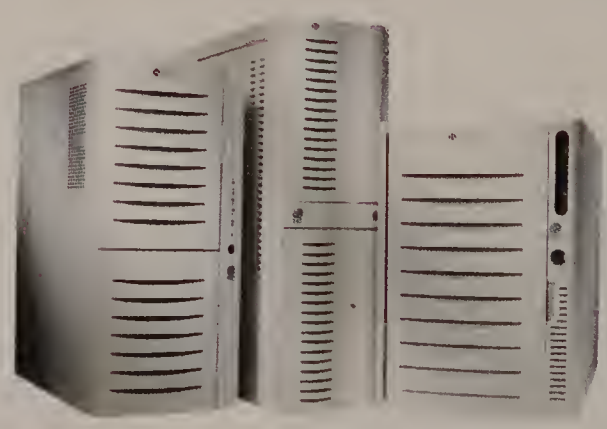

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- FCC Class A[1]

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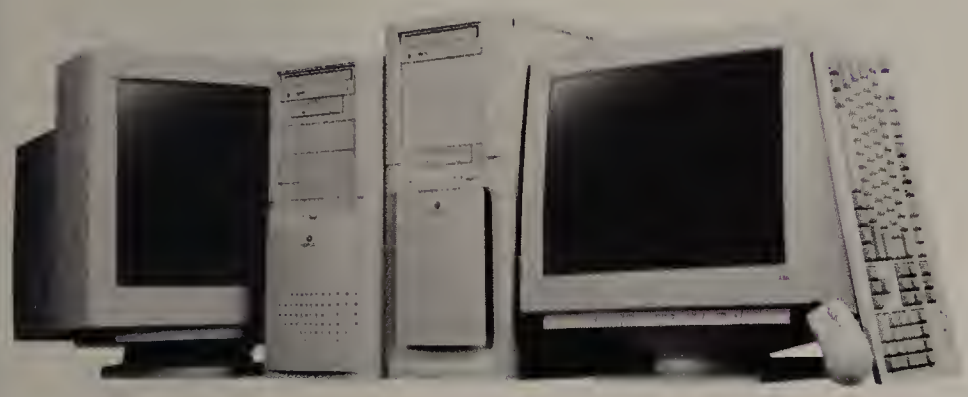

E-5200 350

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- 64MB ECC SDRAM
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- 3COM® 10/100 Ethernet with Wake-up On LAN
- Microsoft® Windows® NT 4.0
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- NSTL Year 2000 Compliant[4]

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- 256MB ECC SDRAM
- 9GB 10K RPM SCSI Hard Drive
- 13X min/32X max SCSI CD-ROM Drive
- VX1100 21" Color Monitor (19.9" viewable)
- AccelGraphics Permedia II with 8MB SGRAM
- 3COM 10/100 Ethernet with Wake-up On LAN
- MS® Windows NT 4.0
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- Integrated Intel 10/100 Ethernet with Wake-up On LAN
- Integrated SoundBlaster® Compatible Audio
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- Intel LANDesk® Client Manager v.3.31
- **3-Year Limited Warranty (includes 3-year onsite service)[3]**
- NSTL Year 2000 Compliant[4]

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E-3200 450

- Intel Pentium II Processor 450MHz with 512K ECC Cache
- 128MB 100MHz SDRAM (expandable to 384MB)
- 10GB SMART II Ultra ATA Hard Drive
- 13X min/32X max CD-ROM Drive
- EV700 17" Color Monitor (15.9" viewable)
- Integrated ATI RAGE PRO TURBO™ 4MB AGP Graphics Accelerator
- Integrated 3COM® 10/100 Ethernet with Wake-up On LAN
- Integrated SoundBlaster Compatible Audio
- MS Windows NT 4.0
- Intel LANDesk Client Manager v.3.31
- **3-Year Limited Warranty (includes 3-year onsite service)[3]**
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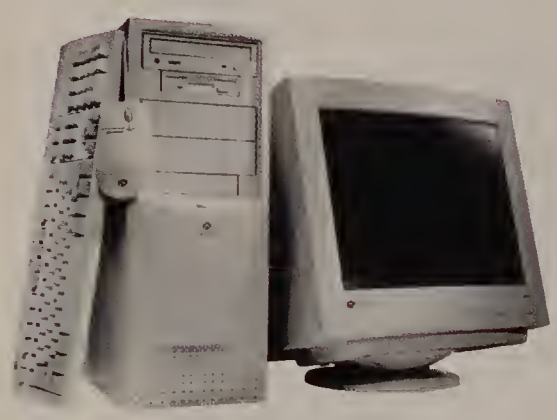

GP6-366C

- Intel® Celeron™ Processor 366MHz with 128K Cache
- 64MB SDRAM
- EV700 17" Color Monitor (15.9" viewable)
- 4MB AGP Graphics
- 6.4GB Ultra ATA Hard Drive
- 13X min/32X max CD-ROM Drive
- Iomega® Internal ZIP® Drive
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GP6-400

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- 96MB SDRAM
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- 10GB Ultra ATA Hard Drive
- 13X min/32X max CD-ROM Drive
- Iomega Internal ZIP Drive
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- SoundBlaster 64D
- Altec Lansing GCS-100 Speakers
- Mid-Tower Case
- 10/100 Ethernet Network Card
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PC WORLD

TOP 10 MONITORS

	17-INCH MONITOR	Month tested	Street price (1/22/99)	Overall rating	Quality of text/graphics	Comments	Product info number
1	IBM P72 800/426-7255 ext. 4753 www.pc.ibm.com/us/accessories/monitors	Oct 98	$529	89	excellent/excellent	FEATURES: 15.7-inch viewable area, .25mm stripe pitch Trinitron tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Along with contemporary style, fantastic colors, and generous tech support, a $20 price cut keeps long-time Best Buy in first place.	–
2	Samsung SyncMaster 700p plus 800/933-4110 www.sosimple.com	Oct 98	$389	89	very good/very good	FEATURES: 15.6-inch viewable area, .26mm dot pitch tube, up to 120-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: $60 price drop lifts this stylish model back into Best Buy territory; bright colors and high refresh rate help, too. Controls have cryptic icons.	661
3	ViewSonic PT775 800/888-8583 www.viewsonic.com	Oct 98	$469	88	very good/excellent	FEATURES: 15.9-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 117-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 11-hour weekday toll-free support. SUMMARY: Model with sumptuous graphics sheds $180, vaults up three notches. Vendor's tech support hours could be longer.	662
4	Optiquest V73 800/843-6784 www.optiquest.com	NEW	$359	87	very good/excellent	FEATURES: 16-inch viewable area, .26mm dot pitch tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 11-hour weekday toll-free support. SUMMARY: Least expensive monitor here displays rich colors, but controls require tedious button pressing and support hours are relatively short.	663
5	Iiyama VisionMaster Pro 400 800/394-4335 www.iiyama.com	Oct 98	$469	86	very good/very good	FEATURES: 15.7-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 115-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 12-hour weekday toll-free support. SUMMARY: $29 price cut and color-correction utilities make up for generic design and hard-to-master on-screen controls.	664
6	AcerView 79g 800/379-2237 www.acerperipherals.com	Oct 98	$429	86	very good/excellent	FEATURES: 15.5-inch viewable area,[3] .25mm stripe pitch Diamondtron tube, up to 110-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 24-hour toll-free support. SUMMARY: Sharp, clean graphics and crisp text compensate for smallest viewable area here and crude on-screen controls.	665
7	Dell UltraScan 1000HS 800/388-8542 www.dell.com	Oct 98	$374	83	very good/excellent	FEATURES: 15.7-inch viewable area, .25mm stripe pitch Trinitron tube, up to 105-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, one-year warranty, 24-hour toll-free support. SUMMARY: Inexpensive model renders graphics vividly. Short warranty extends to three years if monitor is purchased with Dell system.	–
8	Shamrock C709MU 888/801-8899 www.shamrockusa.com	NEW	$445	83	good/excellent	FEATURES: 15.9-inch viewable area, .25mm stripe pitch Diamondtron tube, up to 105-Hz refresh rate,[1] Plug and Play ready,[2] TCO'92 compliant, three-year warranty, 8-hour weekday toll-free support. SUMMARY: Terrific colors and USB ports; but text quality falls behind most others here, and support hours are chintzy.	666
9	Mitsubishi DiamondScan 70M 800/843-2515 www.mitsubishi-display.com	Oct 98	$419	83	good/good	FEATURES: 15.9-inch viewable area, .28mm dot pitch microfilter tube, up to 85-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 12-hour weekday (8-hour weekend) toll-free support. SUMMARY: Monitor contains built-in speakers, but graphics quality lags and on-screen controls aren't intuitive.	667
10	NEC MultiSync E750 800/632-4636 www.nectech.com	NEW	$549	82	very good/very good	FEATURES: 15.9-inch viewable area, .25mm dot pitch CromaClear tube, up to 114-Hz refresh rate,[1] Plug and Play ready,[2] TCO'95 compliant, three-year warranty, 11.5-hour weekday toll-free support. SUMMARY: Space-saving design, bright colors, and dark, crisp text; however, price is the highest here, and support hours are short.	668

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10monitors. All products: 905

TEST PC WORLD CENTER **HOW WE TEST** Ten judges rate a monitor's text and graphics quality. We evaluate each unit on how well it displays typical business letters, a newsletter, spreadsheets, Web pages, and scanned images. The overall rating is based on text and graphics quality (25 percent each), features and ease of use (25 percent), price (20 percent), and service and support (5 percent). The best possible overall rating is 100. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

[1] Highest refresh rate at 1024 by 768 resolution. [2] Plug and Play monitors and graphics cards can communicate bidirectionally. However, Windows 95 does not fully utilize monitor Plug and Play. [3] Newer models feature a 15.9-inch viewable area but were unavailable in time for our testing.

THREE NEW MONITORS crack the Top 10 chart this month. Optiquest's V73 grabs lowest-price honors; Shamrock debuts with its Universal Serial Bus–enabled C709MU; and NEC's MultiSync E750 has a reduced-depth case. ViewSonic's PT775 jumps to third place, thanks to a hefty $180 price cut. New models from CTX and Mag Innovision faltered due to weak image quality. Next month look for our roundup of 19-inch monitors. ■

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0.25mm, 1600•1200
DecaClear® Technology
TCO 92,
USB Function

V385 **$299.**

17"/16.0" Viewable
0.27mm, 1280•1024
1024•768@85Hz
MPRII, OSD Control
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PC WORLD

TOP 10 GRAPHICS BOARDS

	PCI BOARD	Month tested	Street price (2/1/99)	Overall rating	Mixed-media business rating	3D rating	Features rating	Comments	Product info number
1	Creative Labs 3D Blaster Banshee 800/998-5227 www.soundblaster.com	Mar 99	$100	91	good	excellent	good	FEATURES: 16MB of SDRAM, 250-MHz RAMDAC, 3Dfx Voodoo Banshee chip, no bundled applications. SUMMARY: Delivers excellent 3D performance and has a useful color calibration tool. A $30 price cut bumps it up to the top spot this month.	692
2	STB Velocity 4400 PCI 800/234-4334 www.stb.com	Feb 99	$129	90	good	average	excellent	FEATURES: 16MB of SDRAM, 250-MHz RAMDAC, NVidia RIVA TNT chip, bundled graphics plug-ins, video editing tool, and 3D game. SUMMARY: A $20 price drop, great features, pleasing performance, and good support policies make this a terrific value.	693
3	Matrox Millennium G200 SD PCI 800/361-1408 www.matrox.com/mga	Feb 99	$129	86	good	good	good	FEATURES: 8MB of SGRAM, 250-MHz RAMDAC, MGA-G200 chip, bundled 3D modeling tool, image editing application, and 3D game. SUMMARY: Affordable, performs well in graphics-heavy apps; fine for business users and casual gamers.	694
4	Diamond Monster Fusion 800/468-5846 www.diamondmm.com	Jan 99	$150	85	average	excellent	average	FEATURES: 16MB of SDRAM, 250-MHz RAMDAC, 3Dfx Voodoo Banshee chip, bundled 3D games. SUMMARY: Good for gaming, but it's expensive and a little weak on features and business performance. AGP version also costs $150.	695
5	Metabyte Wicked3D Vengeance 510/494-9700 www.wicked3d.com	Feb 99	$99	84	good	excellent	average	FEATURES: 16MB of SGRAM, 250-MHz RAMDAC, 3Dfx Voodoo Banshee chip, bundled 3D game. SUMMARY: Great 3D speed, cheapest PCI card here, but short on apps and thin on support. $99 AGP sibling is good in business graphics, average in 3D.	696
	AGP BOARD								
1	Matrox Millennium G200 800/361-1408 www.matrox.com/mga	Oct 98	$129	93	excellent	good	excellent	FEATURES: BMB of SGRAM, 250-MHz RAMDAC, MGA-G200 chip, bundled 3D modeling tool and image editing app. SUMMARY: Top-notch business graphics speed, rich features, good price. Marvel and Mystique models let you view games on TV.	697
2	STB Velocity 4400 AGP 800/234-4334 www.stb.com	Dec 98	$129	93	good	good	excellent	FEATURES: 16MB of SDRAM, 250-MHz RAMDAC, NVidia RIVA TNT chip, bundled 3D games, video editing tool, and graphics plug-ins. SUMMARY: Has $2D price cut, good all-around performance (especially in 3D), and generous software bundle.	698
3	Hercules Terminator Beast 800/532-0600 www.hercules.com	Dec 98	$80	88	good	good	good	FEATURES: BMB of SDRAM, 250-MHz RAMDAC, S3 Savage3D chip, no bundled software. SUMMARY: Solid overall performance makes this a fine, low-cost upgrade for gaming fanatics, but it's backed by skimpy support policies.	699
4	Elsa Victory II 800/272-3572 www.elsa.com	NEW	$115	88	excellent	excellent	average	FEATURES: 16MB of SDRAM, 250-MHz RAMDAC, 3Dfx Voodoo Banshee chip, no bundled software. SUMMARY: Excellent performance, affordable, and a fine choice for day-to-day graphics chores, but lacks uninstaller and software zoom utilities.	700
5	Number Nine Revolution IV 800/438-6463 www.nine.com	Jan 99	$119	86	excellent	average	excellent	FEATURES: 16MB of SDRAM, 250-MHz RAMDAC, Number Nine Ticket to Ride IV chip, bundled 3D game. SUMMARY: Outstanding mixed-media rating and utilities. Nice for office and occasional 3D gaming; slower in 3D than other AGP boards here.	701

Best Buy For reviews of products that didn't make the chart, visit www.pcworld.com/t10graphics. All products: 908

TEST PC WORLD CENTER **HOW WE TEST** We test boards under Windows 95. Business tests include PC WorldBench 98, a PowerPoint test, and a Macromedia Director script. Dur 3D score is based on four games, each evaluated on frame rate and image quality. For AGP cards we add a texturing test using Caligari's TrueSpace3. We tested PCI boards in a Micron Millennia Mme PC with a Pentium MMX-233 and 32MB of RAM. We tested AGP boards in an NEC Direction 333 with a PII-333 and 64MB of RAM. Overall rating is based on performance (PCI 50 percent, AGP 55 percent), features (25 percent), price (PCI 15 percent, AGP 10 percent), and support policies (10 percent). For all scores, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

LAST MONTH, HALF the chart's ten boards cost $149 or more; now all but one sell for $129 or less. This month's Best Buys from Creative Labs, Matrox, and STB meet or beat that price, with terrific overall performance. Elsa's new Victory II, in fourth place on the AGP list, and Number Nine's Revolution IV, making a comeback, offer splendid business graphics speed. New cards from AOpen, CardExpert, and Creative Labs fell short on features. ■

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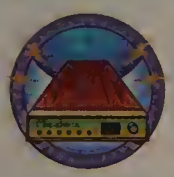
TOP 10 MODEMS

	INTERNAL V.90 MODEM	Month tested	Street price (1/22/99)	Overall rating	56-kbps downloads/ 33.6-kbps transfers (min:sec per MB)	Comments (all modems listed support V.90)	Product info number
1	IBM 56K Modem Internet Kit 800/772-2227 www.ibm.com/pc/us/accessories	Jan 99	$79	81	3:33/5:57	**FEATURES:** Supports x2, 16-bit ISA card, USR/TI chip set, V.80 videoconferencing, distinctive ring, voice mail, speakerphone, DSVD, Caller ID, QuickLink Message Center software. **SUMMARY:** A great SOHO modem, the 56K has voice features, excellent 56-kbps performance, and around-the-clock support.	–
2	Zoom FaxModem 56K PCI Dualmode 800/631-3116 www.zoomtel.com	Jan 99	$64	79	4:16/5:40	**FEATURES:** Supports K56flex, PCI card, Rockwell chip set, MNP-10EC error control, V.80 videoconferencing, distinctive ring, voice mail, Communicate software. **SUMMARY:** Top choice for SOHO on a strict budget has voice features and is backed by long support hours. But it runs a bit slow on 56-kbps downloads.	670
3	Diamond Multimedia SupraExpress 56i 800/468-5846 www.diamondmm.com	Jan 99	$100	78	3:41/5:41	**FEATURES:** Supports K56flex, 16-bit ISA card, Rockwell chip set, V.80 videoconferencing, distinctive ring, voice mail, speakerphone, Caller ID, FaxTalk Communicator software. **SUMMARY:** Excellent candidate for home offices performs well and offers lots of features. Support reps are available 14 hours daily except Sunday.	671
4	Viking V.90 56K ISA Modem 800/338-2361 www.vikingcomponents.com	Feb 99	$60	78	3:23/5:41	**FEATURES:** Supports K56flex, 16-bit ISA card, Rockwell chip set, voice mail, speakerphone, QuickLink III software. **SUMMARY:** ISA modem sells for an exceptionally low price and sports great 56-kbps performance. Viking offers 24-hour support, but the modem's skimpy manual isn't much help.	672
5	Amquest Host PCI 56K Dual Mode Voice/Speakerphone 877/663-3648 www.amquestmodem.com	Feb 99	$49	78	3:35/5:39	**FEATURES:** Supports K56flex, PCI card, Rockwell chip set, MNP-10EC, V.80 videoconferencing, voice mail, speakerphone, VoiceView, ASVD, DSVD, Caller ID, Amquest @fax.com software. **SUMMARY:** Ultracheap modem performs well and has voice features, but it's hard to install, and requires the COM2 assignment.	673
6	Digicom Systems Modem Blaster Flash 56 PCI 800/833-8900 www.digicomsys.com	NEW	$60	77	3:54/5:39	**FEATURES:** Supports K56flex, PCI card, Rockwell chip set, MNP-10, V.80 videoconferencing, distinctive ring, voice mail, speakerphone, ASVD, Caller ID, QuickLink Message Center III software. **SUMMARY:** Full-featured modem has a low price and daily 14-hour on-call support. Thorny installation and middling manuals hold it back.	674
7	Apache Micro Peripherals NetExpress 56K 800/330-1328 www.apache-micro.com	Jan 99	$88	76	3:46/5:42	**FEATURES:** Supports K56flex, 16-bit ISA card, Rockwell chip set, distinctive ring, voice mail, speakerphone, ASVD, Caller ID, MegaConnect Lite software. **SUMMARY:** This reasonably affordable modem offers voice features, but the company limits tech support to just 8 hours per day, weekdays only.	675
	EXTERNAL V.90 MODEM						
1	Diamond Multimedia SupraExpress 56e 800/468-5846 www.diamondmm.com	Feb 99	$120	80	3:23/5:40	**FEATURES:** Supports K56flex, Rockwell chip set, V.80 videoconferencing, distinctive ring, voice mail, Caller ID, permanently attached serial cable, FaxTalk Communicator software. **SUMMARY:** The fastest external modem here is affordable, easy to install, small and portable, and backed by long support hours.	676
2	NewCom V.90 56K External Data/Fax Modem 800/563-9266 www.newcomInc.com	NEW	$76	77	4:09/5:39	**FEATURES:** Supports K56flex, Rockwell chip set, voice mail, speakerphone, Caller ID, serial cable, Trio Communications software. **SUMMARY:** Inexpensive, but it takes 25 to 45 seconds per MB longer on 56-kbps downloads than other modems on chart, and the sparse manuals could confound some users.	677
3	Digicom Systems Modem Blaster Flash 56 II External 800/833-8900 www.digicomsys.com	NEW	$100	76	3:44/5:40	**FEATURES:** Supports K56flex, Rockwell chip set, MNP-10, V.80 videoconferencing, distinctive ring, voice mail, speakerphone, ASVD, Caller ID, serial cable, QuickLink Message Center III software. **SUMMARY:** Affordable modem performs well and carries plenty of features, but documentation needs improvement.	678

Best Buy online For reviews of products that didn't make the chart, visit www.pcworld.com/t10modems. All products: 906

TEST PC WORLD CENTER **HOW WE TEST** We test V.90 (56-kbps) and V.34 (33.6-kbps) performance over a Telecomm Analysis Systems simulated phone network. We connect each modem to two common Internet service provider modems—Ascend's Max 6000 and 3Com's Total Control. Using each ISP modem, we perform two tests. In the Network Model Coverage test, we send a .zip file over several different line conditions. In the File Type test, we send a mix of four files—graphics, text, program, and compressed—over one line condition. We average the results for the two ISP modems to calculate NMC and FT scores, which make up, respectively, 60 and 40 percent of the total performance score. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.



EXTERNAL MODEM PRICES hit an all-time low this month: NewCom's latest entry, which debuts in second place, sells for a modest $76, making it the least expensive modem of its class ever to make the chart. Among internal modems, IBM's 56K Modem Internet Kit remains the clear choice for the home office, thanks to its affordable $79 price, terrific 56-kbps performance, and around-the-clock technical support. ■

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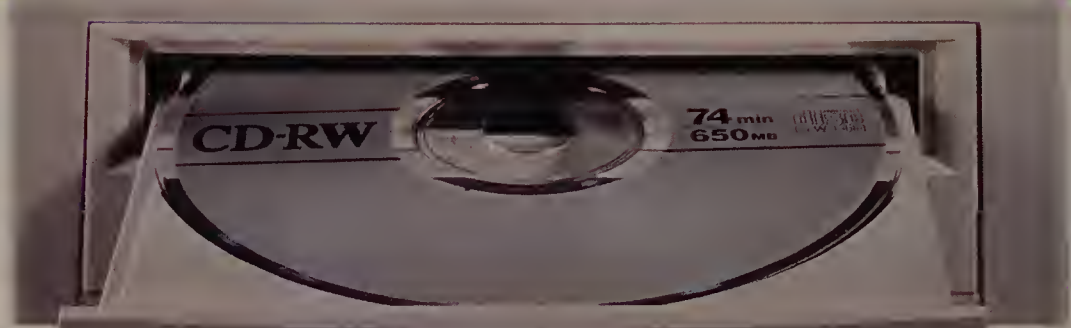

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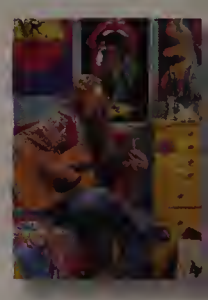

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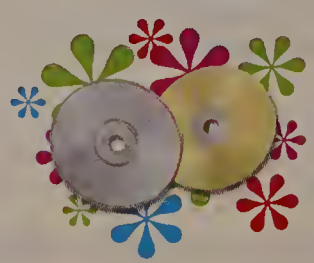

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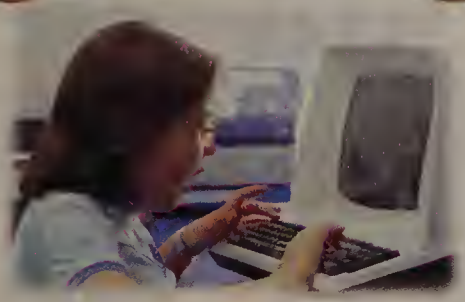

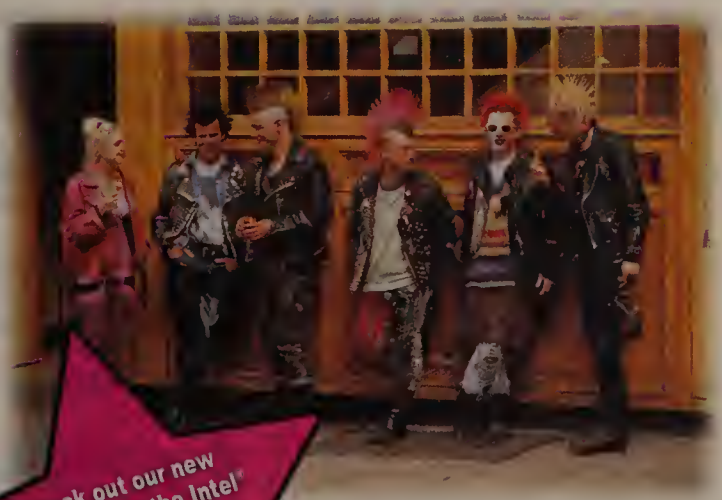

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- 64 MB SDRAM
- 8.4 GB Ultra ATA Hard Drive
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- 1528 Monitor (13.8" Display)
- 40X Max CD-ROM Drive
- Yamaha PCI Wavetable Sound
- Cyber Acoustics CA-50 Speakers with Subwoofer
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HERE'S HOW

WINDOWS TIPS SCOTT DUNN

Divide and Conquer Your Favorites Menu

IF YOU USE WINDOWS 98 or Internet Explorer 4.*x* with Windows 95, you know what an effective navigation tool the Favorites bar is, letting you jump quickly to your, er, "bookmarked" sites and to local folders. (What? You didn't know you could save folders as Favorites? Read on.) Unfortunately, while some people prefer to separate their favorite sites from their frequently accessed local files, the Favorites bar insists on displaying both together. Here's a quick-and-dirty work-around, inspired by the nice separator line you get with Netscape Navigator's Bookmarks menu.

First, make a shortcut you can use as a dividing line: Open your Favorites folder (C:\Windows\Favorites) or choose *Favorites•Organize Favorites* in Internet Explorer. (If you have IE 5, you must go directly to the folder; the new Organize Favorites dialog box won't let you create shortcuts.) Right-click in an empty part of the folder and choose *New•Shortcut*. When prompted to provide a Command line, type the path to any useful file or folder—for example, **c:\windows\favorites**—and click *Next*. For the shortcut name, type a line of underscore marks or hyphens. Click *Finish*.

Now make the icon less conspicuous: Right-click the shortcut and choose *Properties*. Click the *Shortcut* tab, and then click *Change Icon*. Choose one of the available tiny icons, such as the small shortcut arrow, and click *OK* twice. If you're using IE 5 and working in the Organize Favorites dialog box, click *Close*. Click the label *Favorites* at the top of the pane and hit **<F5>** (refresh) to apply the new order.

Now choose your Favorites menu from the Explorer menu bar, and drag and drop icons so all Internet folders and icons are on one side of the line and all shortcuts to often-used files and folders on your computer or network are on the other.

Oddly, unless you have IE 5, you may have to perform this chore multiple times—once to arrange the Favorites menu on the Start menu, once to access Internet Explorer's Favorites menu, and again to reach the Favorites Explorer bar (the one you see when you choose View•Explorer Bar•Favorites). But once you do, a Favorites menu such as the one shown in **FIGURE 1** is much easier to navigate.

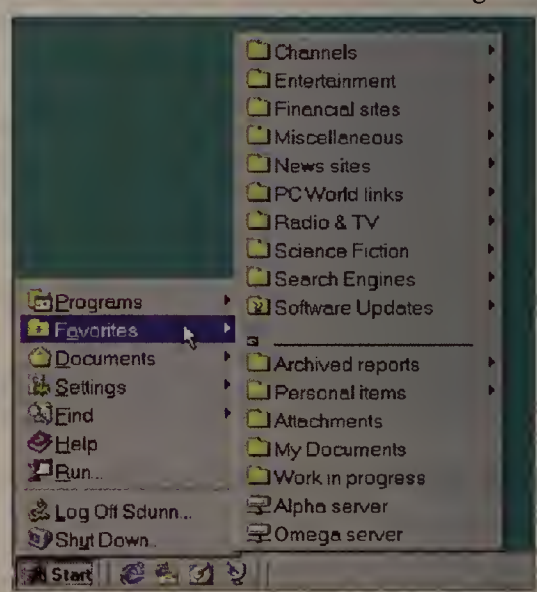


FIGURE 1: SEPARATE the Favorites menu into sections for local files and Web sites.

What happens when you add new items to the menu? If you put new items into the appropriate folders within the Favorites folder, things will take care of themselves. If you add shortcuts to the Favorites folder directly, you may need to do some periodic drag-and-drop maintenance to keep things in order.

For those of you who didn't know, here's how to add files and folders to the Favorites menu: Right-click *My Computer* and select *Explore*. Click the *Favorites* button on the toolbar (the one that looks like a folder with an asterisk), navigate through your system to the files or folders you want to add, right-drag them to the Favorites pane at the left, and select *Create Shortcut(s) Here*. If you're using Internet Explorer 5, select the file or folder you want to add to Favorites, and click the *Add* button at the top of the Favorites pane.

KEYBOARD LONGCUTS: THE NEXT BEST THING

EVERY MOVE YOU make on your computer can be a little faster if you do it with the keyboard instead of the mouse. Even if you have to hit a couple of extra keys, using the keyboard is still faster than reaching for the rodent. Alas, Microsoft didn't create keyboard shortcuts for all of your repetitive chores. Here are some of my favorite keyboard work-arounds for shortcuts I wish Microsoft had included.

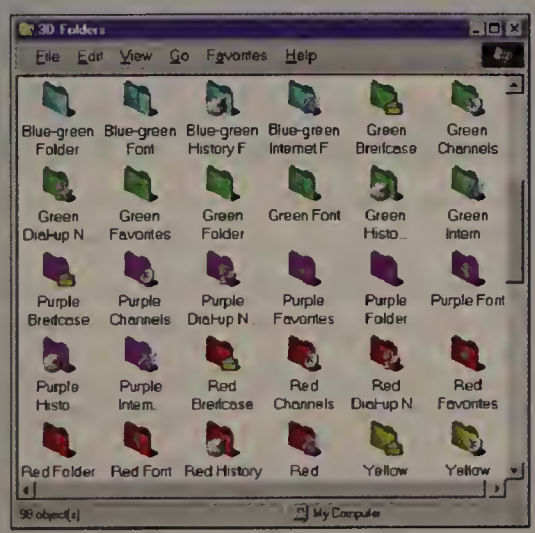
Squelch the screech. When the phone rings or the boss walks in, you don't want your computer to keep blaring out silly system sounds, your latest audio CD, or some Internet broadcast. Unfortunately, the conventional way to silence your system is to fumble with the mouse and click the little speaker icon in the taskbar so you can check the Mute box. Sheesh. Try this instead: In Windows 9*x*, assign a keyboard shortcut to the Volume Control utility by right-clicking the *Start* button, choosing *Open* or *Explore*, and navigating to the Start Menu\Programs\Accessories\Multimedia (or Entertainment, in Windows 98) folder. Right-click the *Volume Control* icon and choose *Properties*. Select the *Shortcut* tab and click in the *Shortcut Key* box. Press your preferred keys (letter or number), which must start with <Ctrl>-<Alt>, <Ctrl>-<Shift>, <Shift>-<Alt>, or <Ctrl>-<Shift>-<Alt>. The next time you need temporary silence, press your shortcut key combination to display the Volume Control, then press **<Alt>-M** to mute all volume levels. Because some sound drivers use the <Alt>-M shortcut for more than one volume level, you might have to hit <Space> afterward or customize the Volume Control so that it shows the master volume only (select *Options•Properties*, uncheck the volume controls you don't want, and click *OK*). When you're ready to restore the old sound level, access the Volume Control with your shortcut key combination, press **<Alt>-M** to restore the sound, and **<Alt>-<F4>** to close the volume window.

Doing the desktop in dialogs. I frequently save files to the desktop for a quick browse before deleting them. But once I choose *File•Open* or *File•Save As* (or the keyboard equivalent), I'm left with no instant way to navigate to the desktop. Applications that use the Windows 98 common file dialog boxes (see "Differences Between Windows' and Office's Dialog Boxes," page 262) give you a handy button for quick trips to the desktop. But if you use another version of Windows or want to use the keyboard, you need a different maneuver. The fastest way to get to the desktop from a Win 95 or NT 4.0 file dialog box is to press in sequence **<F4>**, **<Home>**, and **<Enter>**. If you want the file list to be active after getting to the desktop, press **<F4>**, **<Home>**, and **<Tab>** instead. If you would like to type a file name immediately after reaching the desktop, ▶

W I N D O W S T O O L B O X

Make Folder Icons More Distinctive With 3DFolders

FOLDER SHORTCUTS make fast work of directory and network navigation. But each shortcut has the same dull default icon. Windows offers no relief in the form of color coding, and it provides only a handful of alternative folder icons for remedying the situation. The solution? Try 3DFolders, a freeware collection by Matt Jorde that contains icons for any type of folder, each rendered in seven different colors. These handsome icons look best in 24-bit color, but their distinctiveness and color coding are equally effective if your system displays only 256 colors. Download 3DFolders from PC World Online's FileWorld.



CONTENTS

WINDOWS TIPS
260 Use your keyboard to silence your speakers, devise shortcuts to currently open folders.

WINDOWS NT
264 Create new user accounts, lock down your system when you go to lunch.

ANSWER LINE
268 Clean up Windows by removing unneeded files, decipher cryptic CMOS error messages.

INTERNET TIPS
272 Protect yourself from destructive Web applets, clear up blurry AOL Web graphics.

WORD PROCESSING
278 Save, print, and close in Word using just one command, drag and copy text.

SPREADSHEETS
280 Identify potential Y2K problems in Excel, create a live snapshot of a range.

HARDWARE TIPS
282 Create an emergency Windows start-up disk, learn to hot-swap PC Cards properly.

UPGRADE GUIDE
286 Install a new graphics card, step by step.

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press **<F4>**, **<Home>**, **<Tab>**, and **<Tab>**.

Windows 3.*x* doesn't have a desktop you can use for storage, of course, but if you maintain a directory for work or as a temporary holding area, you can get to that directory faster by putting it in the root of your hard disk and making it start with a unique letter. For example, instead of assigning it to c:\doc\work, use c:\x_work (assuming you have no other folders that begin with *x*). That way, you can navigate to the folder from a dialog box by typing in sequence **<Alt>-D**, **<Home>**, **<Enter>** (to open the root), **x**, and **<Enter>** (to open the first directory beginning with *x*). If you're saving a file, type its name before you use these keys; if you're opening a file, use **<Shift>-<Tab>** to go back to the file list. For faster access, you can automate these steps with a Recorder macro.

SHORTCUT THIS

IF YOU'RE LOOKING at a file or folder icon in Explorer, making a shortcut to that item is easy: Just right-drag the icon to the destination of your choice (desktop or other Explorer or folder window), and choose *Create Shortcut(s) Here* when you see the menu. But what if the folder or document you want a shortcut for is open? Here are a couple of tricks for getting around this problem:

Currently open folder (Win 95, NT 4.0). Making a shortcut to a currently open folder is straightforward if you're using the two-pane Explorer window: Simply right-drag the folder icon from the tree pane. But if you're looking at an open folder window with no tree pane, use this work-around: Press **<Backspace>** to move up a level, and then right-drag the icon of the folder you were in.

Currently open folder (IE 4.0, Win 98). If you're working in Windows 98 or have installed the Windows Desktop Update for Internet Explorer 4.0, drag the folder icon in the upper left corner of the window (the one you click to see the Control menu) to the location of your choice.

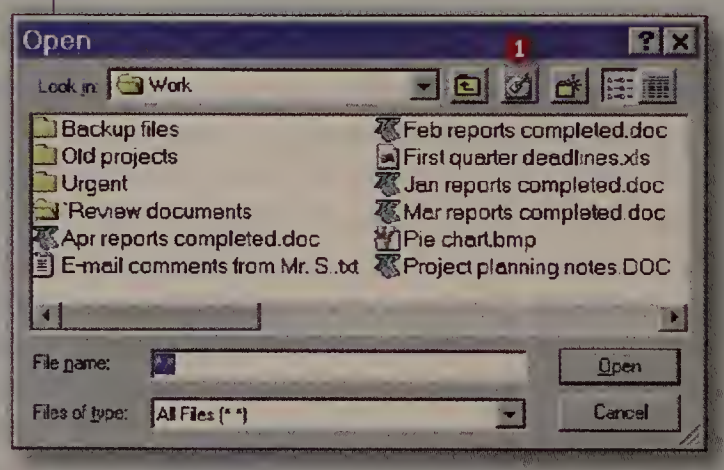
Currently open file. If you're working on a file and want to save a shortcut to it without hunting down its icon in Explorer, perform the following steps: First, if you haven't previously saved the file to disk, do so now. To make the shortcut, choose *File•Save As*. The icon should be visible in the dialog box. Right-drag the icon out of the dialog box, and drop it on the desktop or in any folder window. This tip assumes that your application uses the Windows 98 common file dialog boxes; Microsoft's own Word and Excel programs do not (see "Differences Between Windows' and Office's Dialog Boxes," below). For those applications, try copying a shortcut from the *Start•Documents* menu (where your new file should appear). Open the menu, and use the right-side mouse button to drag the icon to a new location; then choose *Copy Here* or *Create Shortcut(s) Here*.

Find files from this article at www.fileworld.com/magazine and additional tips at www.pcworld.com/heres_how. We welcome your tips and questions and pay $50 for published items. Scott Dunn is a contributing editor for PC World *and a principal author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995). See page 14 for contact information.* ■

Differences Between Windows' and Office's Dialog Boxes

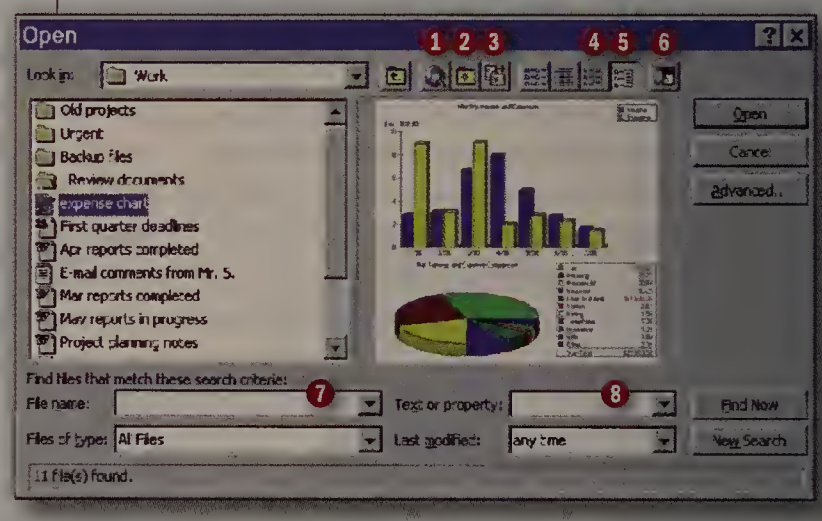
WINDOWS 98'S COMMON DIALOG boxes differ in numerous ways from Office 97's. For example, while Windows 98's Open dialog (below) has one feature that Office 97's lacks—a button to toggle between the current folder's contents and the desktop's—Office 97's Open dialog (right) has eight features all its own. Know the differences between the respective dialog boxes and you'll be able to make the most of each.

Windows 98 Common Dialog Box



❶ Toggles between current folder and desktop

Office 97 Dialog Box



❶ Launches browser for finding files on the Web

❷ Toggles between current folder and Favorites folder

❸ Adds current folder or selected item to Favorites folder

❹ Displays pane listing properties of selected item

❺ Displays preview pane for selected item

❻ Displays menu of commands for acting on selected item

❼ Drop-down list (not simply a box) of recent file specifications

❽ File-search features (replaced in Save As with customization options)

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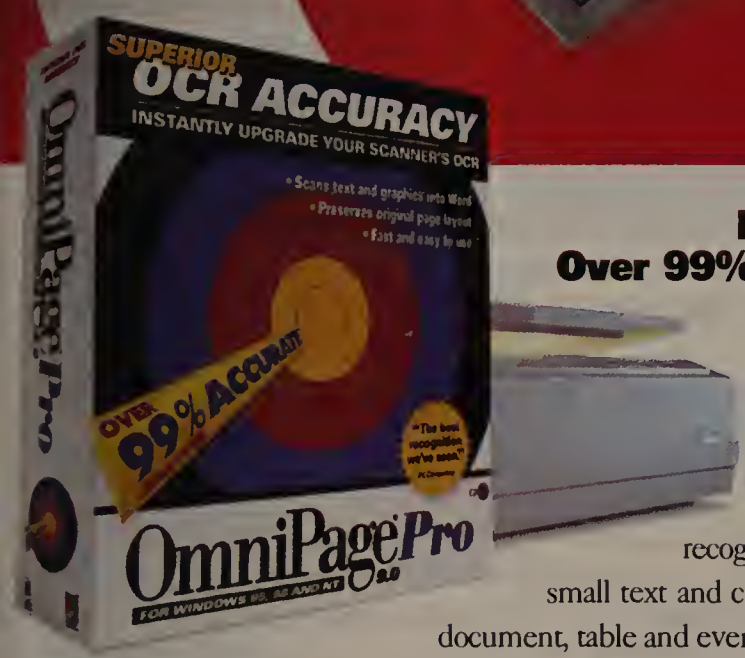

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Secure NT Against Snoops and Other Colleagues

IF YOU'RE LIKE most users, you probably don't think much about who has access to your PC. Do you know who's been reading your mail at night? And what about those performance evaluations and salary recommendations you're working on? Even if you work from home, you may want to keep roommates, spouses, or kids from accidentally deleting your files, e-mail, or personal finance records.

Windows NT provides real log-in security, user accounts, and file-access controls. But you don't get all those benefits until you change some settings. The first task is creating a user account for yourself. "What?" you ask, "But I'm already 'Administrator'." And your password is probably *password*, right? NT creates the Administrator account when you first install, but you don't need most of its sweeping powers every day. To take its place, you can create a user account for yourself in the Users or Power Users group (the latter allows you to share directories and printers with others on the network).

To create a new user account, choose *Start•Programs•Administrative Tools (Common)•User Manager* to open Windows NT's User Manager. Next, select *User•New User* (see **FIGURE 1**). Enter a short, descriptive user name and type a password into the 'Password' and 'Confirm Password' fields. Make the password something memorable that you don't need to write down, and the longer it is, the better—Windows NT allows up to 14 characters. Avoid words from the dictionary and repeating characters (like "123123"). Next, uncheck *User Must Change Password at Next Logon*, and check both *User Cannot Change Password* and *Password Never Expires*. The new user account will automatically be part of the Users group; if you'd like to add it to the Power Users group as well, click the *Groups* button, choose *Power Users* in the 'Not member of' window, click *Add*, and click *OK*. Click *OK* again to create the new user account.

While you're at it, rename the Administrator account—and choose a good password—to make it more difficult for anyone to break into it. Renaming the account is straightforward: Simply open User Manager, select the account, choose *User•Rename*, enter the new name in the 'Change To' field, and then click *OK*.

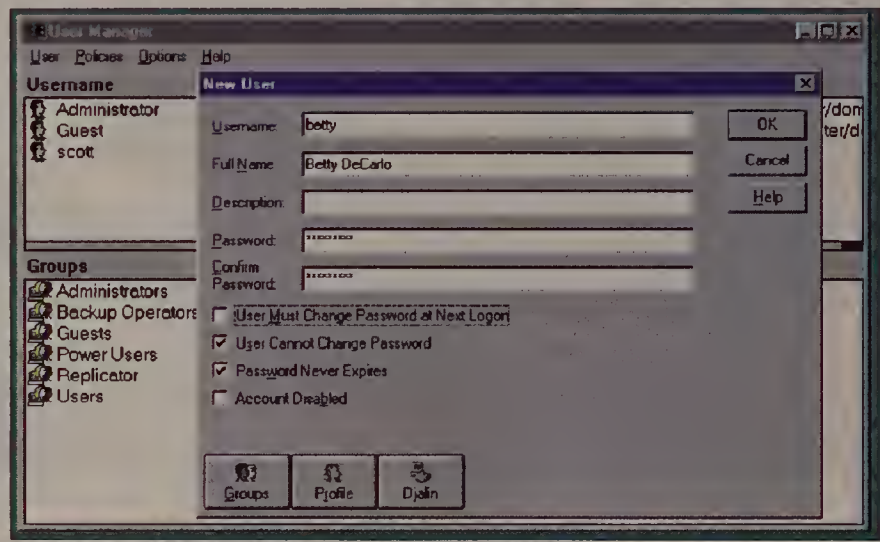

FIGURE 1: YOU CAN CREATE AN ORDINARY (non-Administrator) user account for yourself or another user with Windows NT's User Manager.

LOCK YOUR WINDOWS

NOW THAT YOU have a real user account and password, you can walk away from the computer secure in the knowledge that nobody else will have easy access to it. Disclaimer: If you installed Windows NT to dual-boot with Windows 9*x* and/or 3.*x*, or installed to an existing FAT partition without converting the partition to the NTFS file system, anybody with a Windows NT installation disk can take control of your system. (Next month's column will explore the other major aspect of Windows NT security: file systems and file-access security.)

To lock down your system and go to lunch, leaving your work right where it is, press **<Ctrl>-<Alt>-<Delete>** and then click the *Lock Workstation* button. Be sure to save what you're working on before you mosey off. Other users, including the Administrator, can log back on in your place—an act that will log you off and close your programs without saving open files. To get back on, press **<Ctrl>-<Alt>-<Delete>** again and enter your password.

Don't want to bother locking down every time you leave your desk? Let NT do it for you. Right-click the desktop, choose *Properties*, and click the *Screen Saver* tab. Select the screen saver of your choice, adjust the Wait and other settings to your liking, and then check *Password protected* and click *OK*. The screen saver will kick in automatically after the time-out you set, and the only way back in is to enter your password. Now you can let yourself get caught up in conversation at the water cooler without worrying about office snoops.

Scott Spanbauer is a contributing editor for PC World. *Send your questions and tips to nttips@spanbauer.com. We pay $50 for published items.* ■

Make Dial-Up Shortcuts

ONE OF MY FAVORITE time-savers is putting a shortcut to my most frequently used Dial-Up Networking connections on the Start menu. It's a simple drag-and-drop affair in Windows 9*x*, but not in NT. Open Dial-Up Networking (*Start•Programs•Accessories•Dial-Up Networking*), choose the Phonebook entry to which you want to link, click *More*, and choose *Create shortcut to entry*. In the next dialog box, navigate to *\Winnt\Profiles\username\Start Menu* (where *username* is your log-in name), and click *OK*.

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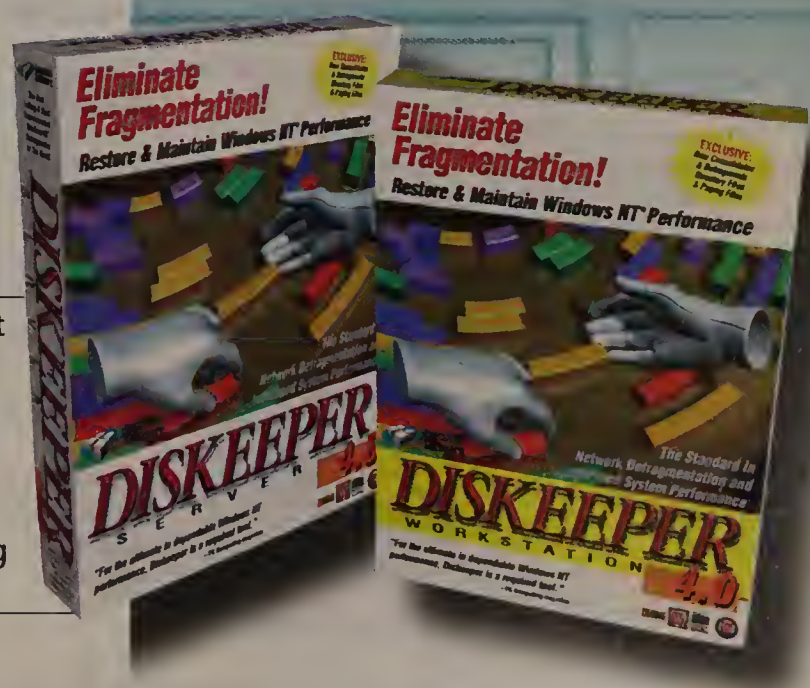

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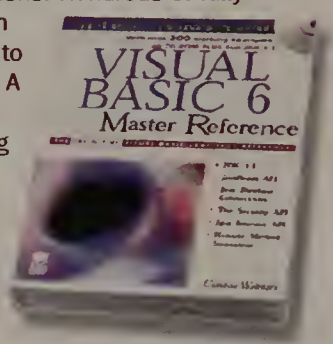

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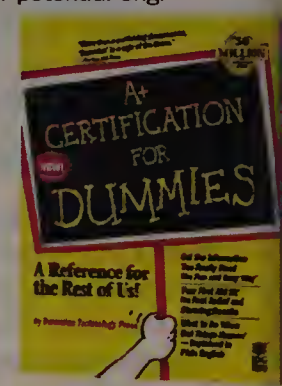

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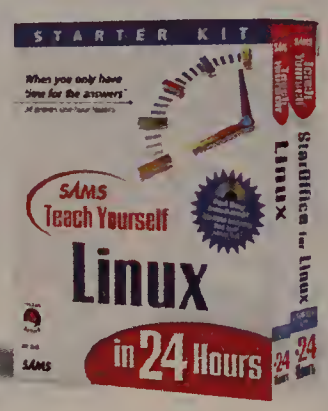

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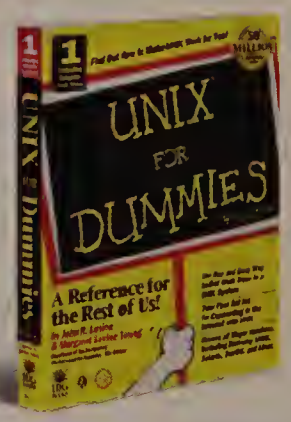

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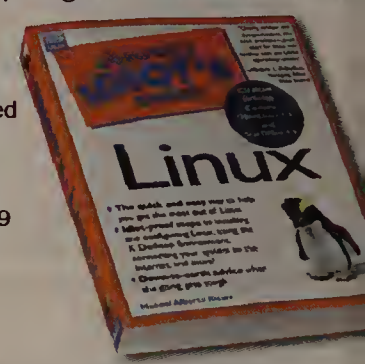

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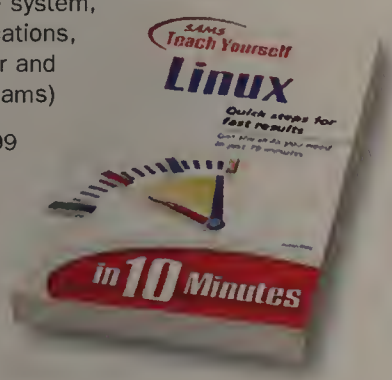

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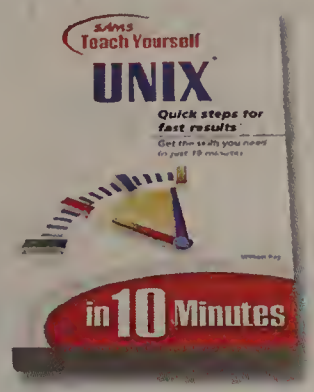

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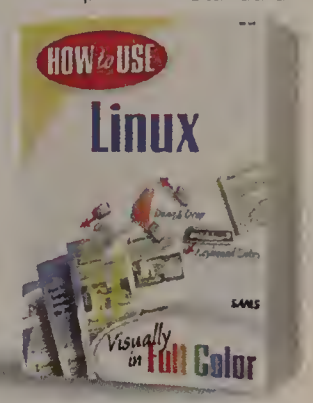

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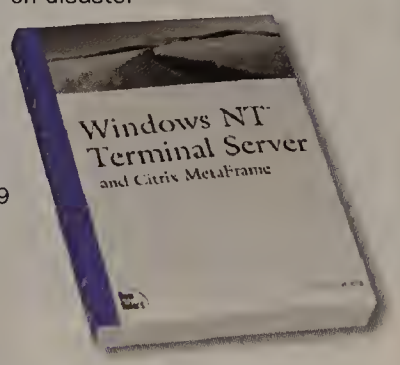

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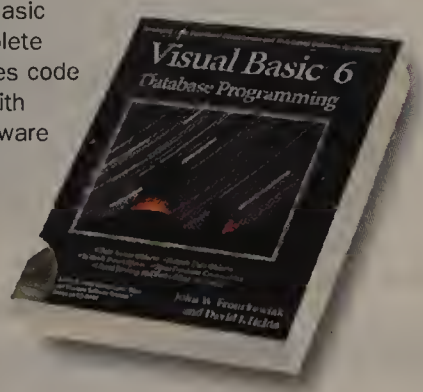

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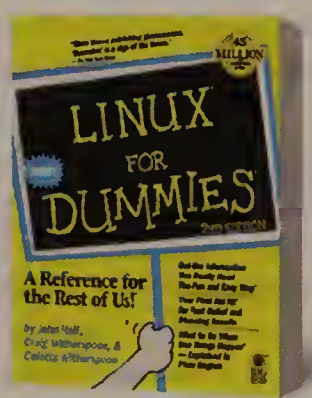

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YOUR QUESTIONS ON: Reducing Windows' footprint ◆ **Quicken and Money checks**

Purge Unneeded Files From Windows

I NEED MORE free hard drive space. Which of the countless files that came with Windows can I delete? Surely I don't need those in the Windows\Application Data\Microsoft\Welcome folder.

Charles Colchamiro, Brooklyn, New York

YOU'RE RIGHT; there's no reason to keep that folder. But before we get into files you can trash, here's some general advice:

A lot of the files you don't need are hidden. To see them in Windows Explorer, select *View•Options* (or *Folder Options*). On the *View* tab, select *Show all files*, then click *OK*.

Also, when in doubt about deleting a file, move it to another folder or drive, or zip it. If its absence hasn't caused any problems after three months—for instance, if no program has displayed an error message or refused to load because the file wasn't there—get rid of it. Of course, have an emergency start-up disk handy in case you move a file needed to boot your PC (see *Hardware Tips*, page 282).

The following is a list of some kinds of Windows files you might want to lose:

• **Unwanted Windows features.** Select *Start•Settings•Control Panel•Add/Remove Programs*. Click the *Windows Setup* tab. For each component with a check in its box, click its name and then the *Details* button, scroll through and uncheck features you don't want, and click *OK* to move to the next checked component. If the Details button is grayed out and you know you don't want the component, simply uncheck it. If you've upgraded Windows and you're sure that you don't want to go back to the older version, click the *Install/Uninstall* tab and then look for *Old Windows 3.x and MS-DOS System Files* or *Delete Windows 98 uninstall information*; if you find either of these, uninstall it.

• **Root directory garbage.** In Explorer, go to C:\, select *View•Details*, click the *Type* header, and use a text editor (like WordPad) to look at files with the extension .txt, .old, .log, .prv, or .---. Chances are they're all deletable. If you regularly back up the Registry, kill System.1st. If you don't dual-boot, delete any .dos files.

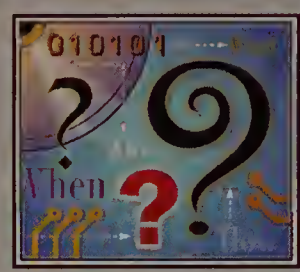
• **Wallpaper.** Delete any of the wallpaper (.bmp) files in C:\Windows that don't particularly strike your fancy.

• **Help file indexes.** You can delete help file indexes, since Windows recreates them as needed. Click *Start•Find•Files or Folders*. In the Named field, enter ***.fts**, select a hard drive in the 'Look in' field, and press **<Enter>**. Delete all files that appear as a result of the search.

• **Memories of 3.x.** If you've upgraded from Windows 3.x, you may have a folder called C:\Windows\System\win32s. Delete it.

• **Odds and ends.** You can consider dumping any file in the Windows folder that has the extension .log, .bak, .old, or .---. If you turn off your computer at night, you don't need anything in the Windows\Temp folder that's more than a day old.

Windows 98 comes with Disk Cleanup, a program that handles at least some of the file buildup problem. You'll find it at *Start•Programs•Accessories•System Tools*. Select the *Disk Cleanup* tab to clean up day-to-day garbage (see **FIGURE 1**). Use the *Clean up* button on the *More Options* tab to bring up the Add/Remove Programs Properties box to uninstall unwanted Windows features and programs.



Easier Format and Upgrade

IN NOVEMBER 1998 *Home Office*, Steve Bass suggested wiping out Windows 95 before upgrading to Windows 98 (see www.pcworld.com/nov98/home). Reader Ray Pixton found a way to make this process easier. Start the Win 98 upgrade while Win 95 is up and running. Once the installation program has created a start-up disk, abandon the installation and wipe out Win 95. Then boot from the start-up disk. Its generic drivers for CD-ROM drives will give you easy access to the upgrade CD-ROM.

PROTECT YOUR CMOS

MY COMPUTER KEEPS telling me I have a 'CMOS Checksum Error'. What's wrong? What should I do?

Andrew Riha, Edmond, Oklahoma

THE CMOS (Complementary Metal-Oxide Semiconductor) error message is referring to a battery-backed chip on your motherboard that holds hardware configuration information. Some of it—for example, the type of hard disk you have installed—is pretty important. ▶

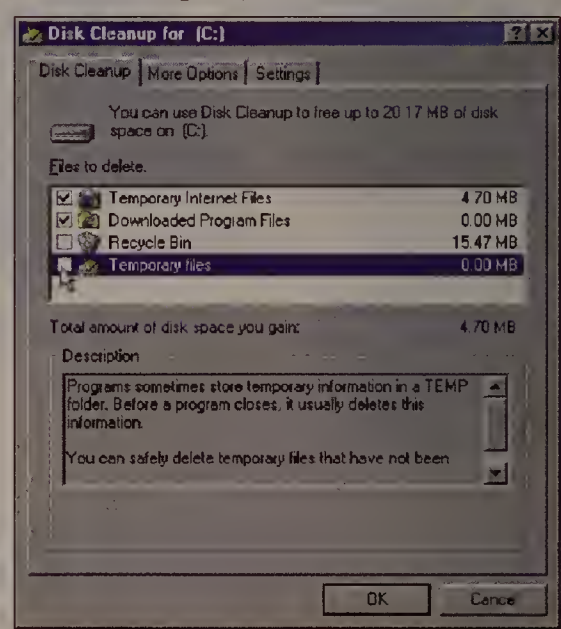
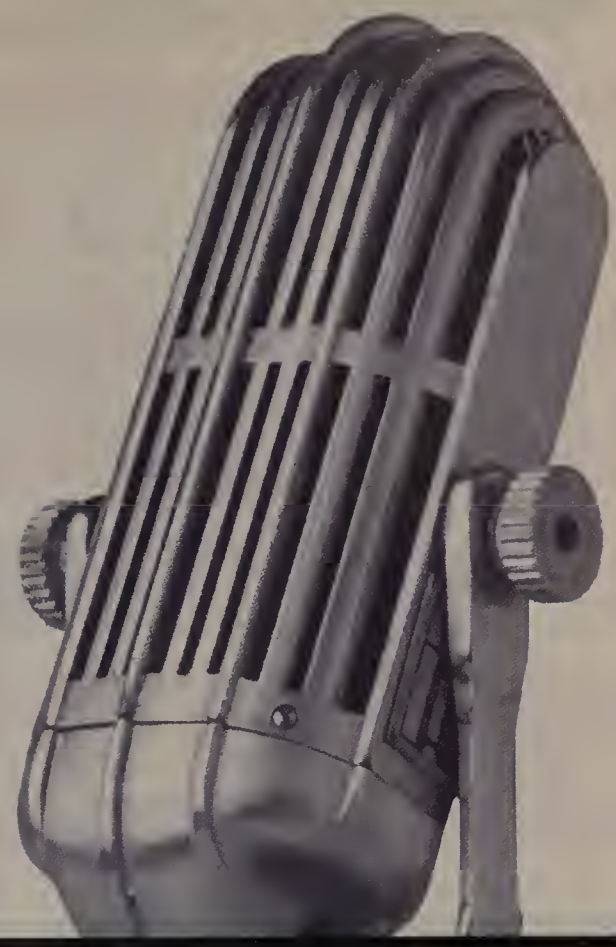


FIGURE 1: CLEAN UP YOUR HARD DRIVE with Windows 98's Disk Cleanup.



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This data is not something you want to lose. If you don't have a program like Norton Utilities or Nuts & Bolts that backs up the CMOS information, you need to print it out or write it down: Enter the PC setup program by pressing **<Delete>** or some other key (often noted on screen) early in the boot-up process—before Windows starts loading. Go to each screen of the program and press **<Print Screen>** to make a printout, or write down the info.

About that error: Your PC generates the error if it thinks the CMOS information has changed without your having changed it. A virus, a dying battery, or a one-time anomaly can cause this situation.

When you get this error message, you need to restore the CMOS settings. If you have Norton's or Nuts & Bolts' Rescue Disk, reboot from that emergency boot floppy and follow the prompts. If your backup is on paper, you'll have to enter your system's setup program and restore the settings manually. If you don't have a backup, research your system's configuration using printed documentation, or call the vendor.

When you've reentered the information, save your changes and boot your PC. Make sure everything is working properly, then close Windows and turn off your computer. After a few minutes, turn it on again. If the error returns, you've got a dying battery. You'll have to open your PC, find the battery, and replace it—or find a technician to do the job for you. If your battery is soldered on to the motherboard, you'll have to replace the motherboard, too. (Computer batteries last about five years.)

If the problem isn't the battery, update your antivirus program and run a scan. If the scan doesn't find anything, hope that the CMOS loss was a freak accident and won't happen again.

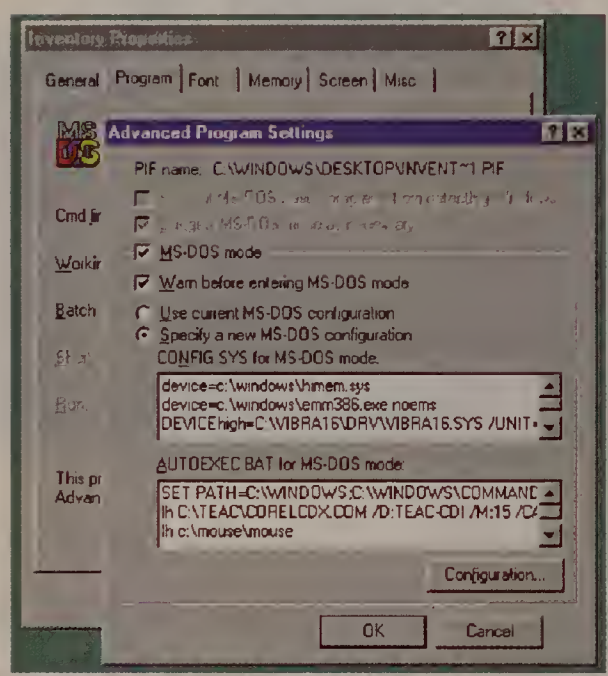

FIGURE 2: GIVE A DOS PROGRAM room by specifying how it loads and what other files get loaded.

MORE RAM FOR YOUR DOS APPS

WE HAVE SEVERAL hundred dollars' worth of DOS software that can't get enough conventional memory to run in Windows 9*x*. These are all programs that require 640KB and ran fine in DOS 6.22. What can we do?

Cindy Mutchie, Montgomery, Alabama

THE VERSION OF DOS that comes with Windows 9*x* should give you as much free conventional memory (the lower 640KB) as version 6.22 did. You may not have your programs configured correctly. Here are a few strategies to try.

If a DOS program is giving you trouble, set it up to exit Windows and run in MS-DOS mode: Right-click the shortcut you use to launch the program, and select *Properties* from the pop-up menu. Click the *Program* tab, then the *Advanced* button. If the 'MS-DOS mode' option isn't checked, check it now (see **FIGURE 2**). Then select *Specify a new MS-DOS configuration*. The commands listed below that selection should be the same ones that were in your old DOS config.sys and autoexec.bat files.

The commands you need depend on your hardware and the DOS program's requirements. For instance, if the DOS program doesn't use a mouse, you can delete any lines with the word *mouse*.

You can do some additional tweaking to free up more RAM:

- In the config.sys window, turn every instance of *device=* into **devicehigh=**.
- In autoexec.bat, look for lines that load a program (not ones that begin with 'set') and add **lh** (for load high) and a space to each of them. For instance, 'c:\windows\mouse' would become **lh c:\windows\mouse**.
- Add these lines to the beginning of config.sys (or move them there if they're already in your file), in this order:

dos=high, umb
device=c:\windows\himem.sys
device=c:\windows\emm386.exe noems

(Yes, that's *device=*, not *devicehigh=*. You don't need the 'high' here.)

One more thing: Your DOS program may need expanded memory—an old trick to get around DOS's 640KB RAM barrier. Check the program's documentation. If it does, change the third line above to **device=c:\windows\emm386.exe ram**.

CHEAP CHECK PRINTING IN QUICKEN OR MONEY

I'M CONSIDERING buying either Intuit's Quicken or Microsoft Money. I want to use the program to print my checks, but I find that both Intuit and Microsoft charge exorbitant rates for program-compatible printer checks. Can I get a better deal elsewhere?

Alan Boldt, Portage, Michigan

EXORBITANT IS THE right word. Intuit charges $55 for 250 wallet checks. In comparison, Microsoft's deal looks like a bargain: $40 for the same number. But several other companies sell 250 Quicken- or Money-compatible checks for less than $25. Two such firms are PC Checks & Supplies and Sensible Solutions.

You might be tempted to print your own checks. Software to do this is available, but fight the temptation. Banks expect the numbers at the bottom of checks to be printed with special magnetic ink. Without that feature, the bank must process the checks manually, which could result in fees.

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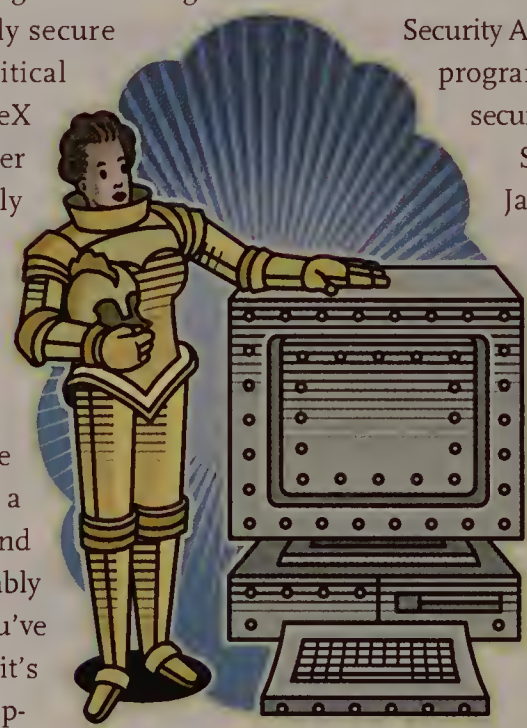
Source Code: MU49

Suit up against viruses ◆ Find Easter eggs ◆ View any e-mail attachment

Defend Yourself Against Malicious Web Applets

IS THERE SUCH a thing as a Web virus? The answer depends on whom you ask. At this writing, not one case of Web infection has been recorded, though several hackers have proved it's possible to create a "malicious" or "hostile" applet that crashes your system or causes data loss when you open it. Fortunately, Java, the most popular language for creating Web applets, is extremely secure and can't access critical system areas. ActiveX controls, on the other hand, can potentially gain access to your hard disk and wreak havoc, but they are not as widespread as Java programs.



Still, it's conceivable you might run into a malicious applet. And if you do, you probably won't know that you've been infected until it's too late, since Web applets run behind the scenes while you visit a Web site that contains them. In that respect, they're considered more dangerous than traditional viruses because you can't protect yourself against them as you can against other viruses (say, by never downloading any files). But here are some safety measures you can take.

Run the latest version of your browser and e-mail client to keep all known security holes plugged. In the past year Qualcomm released a security patch for Eudora (see eudora.qualcomm.com/pro_email/updaters.html), and Netscape released one for Messenger (go to Netscape's SmartUpdate page, at home.netscape.com/smartupdate/su1_40.html). For its part, Microsoft has posted numerous security patches for Internet Explorer 3.*x* and 4.*x*—which are downloadable at the IE Security page (www.microsoft.com/windows/ie/security/default.asp). You can also subscribe to Microsoft's Product Security Advisor e-mail notification program (www.microsoft.com/security/services/bulletin.asp).

Some people disable both Java and Javascript in their browsers as an additional safety precaution; but because Java is a secure environment, that isn't necessary. If you use IE, however, you should be wary when you download any ActiveX controls. You can configure IE to exercise different levels of caution when downloading these applets (when you go to sites that feature them, you'll be prompted to confirm the download): Select *View•Internet Options* and click the *Security* tab. For the Internet Zone, set the security level to medium or high (see **FIGURE 1**). At the high setting, IE will not permit you to download any uncertified controls. Also, Microsoft's original implementation of Java in IE 4 falls short of Sun's strict specifications; a new patch available on www.microsoft.com/java makes this environment somewhat safer for IE users.

OLD-FASHIONED VIRUSES, TOO

MALICIOUS CODE isn't the only peril that lurks in the shadows of the online jungle. Lingering still is the menace of traditional viruses, the kinds you get with innocent-looking downloads and freebies. Here's a checklist of the best pieces of armor you can don to protect yourself against such viral attacks:

Deploy antivirus software. Stick with brand-name antivirus software that monitors e-mail and scans file downloads. Update its viral signatures monthly. Keep its monitoring feature turned on (even when Web sites tell you to turn it off to download ActiveX controls). The latest versions of Symantec's $50 Norton AntiVirus 5.0 and Network Associates' $50 McAfee VirusScan 4.0 (both available as "trialware" downloads on FileWorld) scan scripts that Web sites send to your browser to run. Of the two, we give the nod to Norton AntiVirus, which won a Best ▶

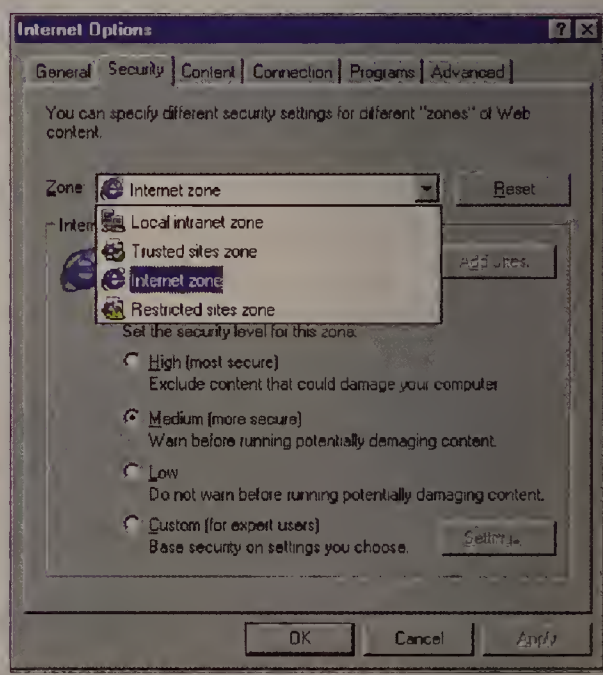


FIGURE 1: IN INTERNET EXPLORER, select a security level before downloading ActiveX controls.

Quick Fix For Junk Mail Woes

ONE WAY MASS marketers get your e-mail address is by buying it from sites that require registration. So make it easy on yourself. Get an e-mail account with one of the many free Web-based e-mail providers (such as mail.yahoo.com, www.usa.net, or www.hotmail.com), and fill in that address on those registration forms at subscription-free sites. And here's the trick: Never use your free account for any other purpose. But do visit it periodically and delete the contents of its flooded in-box.

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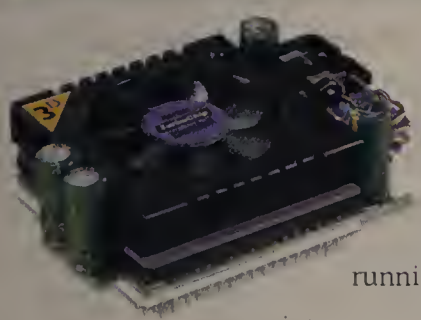

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PRODUCT INFO NO. 610

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$50 street; Symantec; 800/441-7234; www.symantec.com
PRODUCT INFO NO. 611

Quick View Plus 5.0
$59 list; Jasc Software; 800/622-2793; www.jasc.com
PRODUCT INFO NO. 612

Buy in our February issue (see "Virucide!" www.pcworld.com/feb99/antivirus). Make sure you activate the option to scan Word and Excel macro viruses, the most common workplace viruses around.

Never run software that strangers e-mail you. Although you can't get a virus just by reading an e-mail message, you can seriously damage your system by running a program file that's attached to such a message. These Trojan horses pretend to be something they're not (usually a free tool) and are difficult to detect, even with the most recent antivirus software.

Download software only from known servers and Web sites. Most large shareware libraries are extremely conscientious about virus-scanning their offerings, because their livelihood depends on the quality of the downloads they offer. Be wary of sites with links to external servers, because they can't control what you get. Virus-scan all downloads you get via such forwarders.

Fix Blurry AOL Web Graphics

DO YOU AT TIMES get poor-quality graphics on AOL 4.0's Web browser? They might have been compressed to improve download speed (as shown in screen at lower left from a businesswomen's site). To change that setting, click *My AOL•Preferences* and click the *WWW* icon. Head to the *Web Graphics* tab and remove the check beside *Use compressed graphics*. Click *Apply*, then *OK*.

BORED? HERE'S AN EASTER EGG

ONE OF THE LEAST important yet most popular features of any software is its so-called Easter egg, a hidden feature you activate by pressing a set of secret keystrokes. A typical Easter egg yields a video clip, animation, or program credits.

In Internet Explorer 4, click *Help•About Internet Explorer*. Hold down **<Ctrl>** while you drag the small "e" icon to the left—along the black line, down and across the globe, then across the IE logo. Release the mouse when the logo moves out of the way. Click the *Unlock* button that appears. Hold down **<Ctrl>** again, drag the "e" to the shaking globe and drop it there. A credits screen will roll across the screen, along with gags about dubious features that never made it into IE 4, such as the Scratch 'n' Sniff Toolbar.

You can read about the Easter eggs in your favorite software by heading to The Easter Egg Archive (www.eeggs.com), which is run by David Nagy-Farkas, author of the book *Easter Eggs: Software Secrets* (Abacus, 1997).

GATHER E-MAIL WHILE YOU SLEEP

I CUT MY INTERNET teeth on AOL and soon moved to an ISP. I do miss AOL's FlashMail, the tool that fetched my e-mail at preset times, without my intervention. Is there an app that will dial up my ISP, connect to my POP server, download my mail, and log off?

Chris Linden
Via the Internet

YOU CAN SET up Outlook Express to dial your ISP and collect e-mail for you even when you're not around. Click *Tools•Options*. Under the *General* tab place a check beside *Check for new messages every x minutes*, and specify how often you want the program to check for mail. Now head to the *Dial-Up* tab, and place checks beside *Hang up when finished sending, receiving, or downloading* and *Automatically dial when checking for new messages*. Click *Apply*, then *OK*. You'll need to keep Outlook Express activated. If you're running Windows 95, you'll have to update Dial-Up Networking to give it the ability to make unattended connections. You may download the free DUN 1.3 from FileWorld.

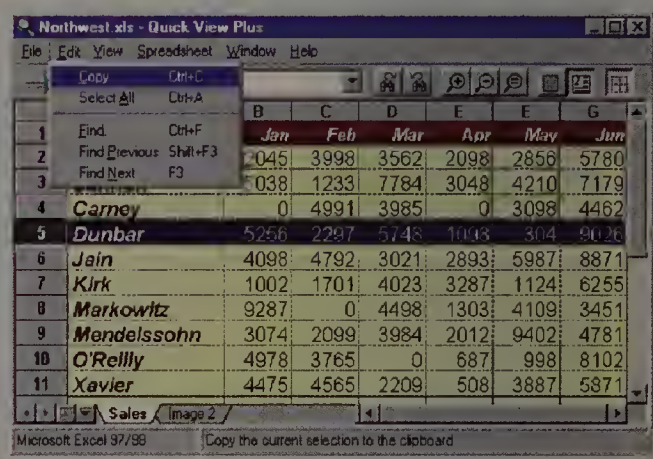
HOT DOWNLOAD

Display Any E-Mail Attachment

DO YOU GET e-mail attachments you can't view because you don't have their originating application (say, WordPerfect or Paradox)? With Jasc's Quick View Plus 5.0 you can quickly view attachments in over 200 file formats—images, spreadsheets, word processors, and databases, even antediluvian DOS applications like Multimate and Wang.

Quick View Plus works as a stand-alone utility (right-click an icon to view it) or as a plug-in for Eudora, Exchange, Internet Explorer, Messenger, Navigator, Outlook, and more.

You can print documents, cut and paste objects between documents you're viewing and those you're creating (you can't modify viewed documents, though—this is just a viewer), and run searches. Quick View will also display compressed files in various formats including ZIP, LZH, and UUE. You can download a trial version of the $59 Quick View Plus from FileWorld.



Find files from this article on PC World Online's FileWorld at www.fileworld.com/magazine. We welcome your questions and tips and pay $50 for published items. Contributing Editor Judy Heim is a coauthor of The Quilter's Computer Companion *(No Starch Press, 1997). See page 14 for contact information.* ■

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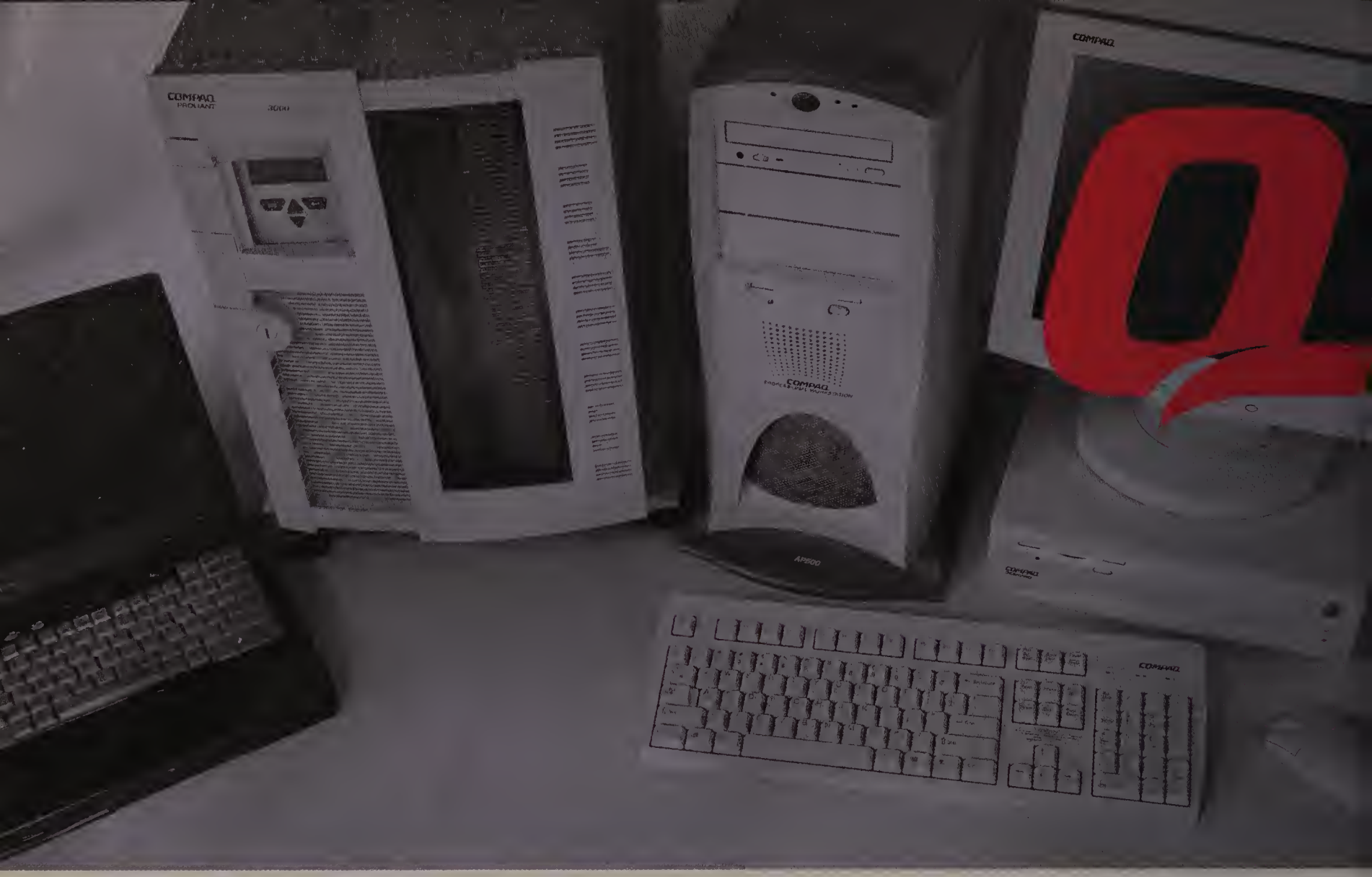

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Save, Print, and Close With One Command

IF YOU'RE LIKE most users, the commands you employ most often in a newly created document are Save, Print, and Close. If only Microsoft had thought to combine these steps into one command. Fortunately, a quick-and-dirty macro can make a single command out of the three and add it to Word's *File* menu. Once you start to use it, you will wonder why such a handy tool wasn't built directly into the program.

Note: If you select the new command but the file has not previously been saved, Word will display the Save As dialog box to let you provide a file name.

Here's how to create this multicommand macro for your version of Word (see also **FIGURE 1**).

To create the macro in Word 97:

1. In Word, select *Tools•Macro•Macros.*
2. Type **SavePrintClose** in the 'Macro name' field of the dialog box, then click *Create.*
3. Carefully type the three lines of macro text below, between the Sub SavePrintClose() and End Sub lines in the macro editor. Include punctuation as shown.

```
ActiveDocument.Save
ActiveDocument.PrintOut
ActiveDocument.Close
```

4. Select *File•Save Normal* and then *File•Close and Return to Microsoft Word.*

In order to add the macro to the File menu, follow these steps:

1. Select *Tools•Customize.*
2. Click the *Commands* tab.
3. Select *Macros* in the Categories list (you must scroll down a bit to reach it).
4. Click the *File* menu from the toolbar.
5. Click and drag *Normal.NewMacros.SavePrintClose* from the Commands list of the Customize dialog box, then drop it just under the Close command within the File menu.
6. Click *Close* in the Customize dialog box.

To create the macro in Word 6 and 7:

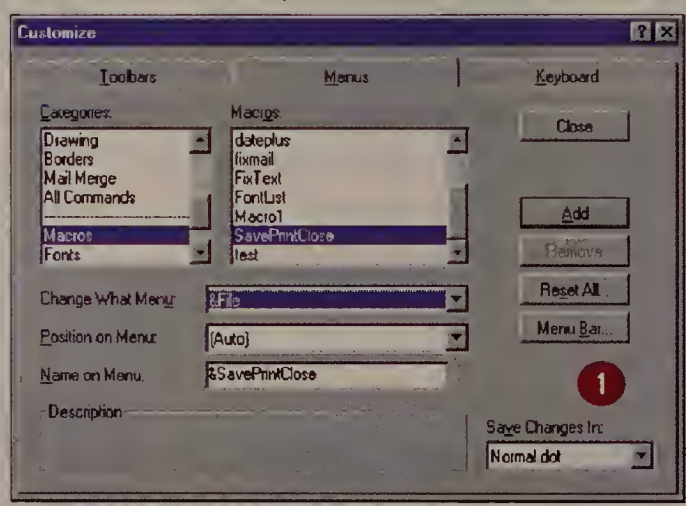
1. With Word running, select *Tools•Macro.*
2. Type **SavePrintClose** in the Macro Name field of the Macro dialog box; click *Create.*
3. Carefully type the bolded text below into Word, between the Sub MAIN and End Sub lines.

```
FileSave
FilePrint
FileClose
```

4. Select *File•Close* and click *Yes* when prompted to save the changes in the macro you've created.

To add the macro to the File menu:

1. Select *Tools•Customize.*
2. Click the *Menus* tab in the Customize dialog box.
3. Select *Macros* in the Categories list, and *SavePrintClose* in the Macros list.
4. Select *&File* from the Change What Menu drop-down list.
5. Click *Add*, then click *Close.*



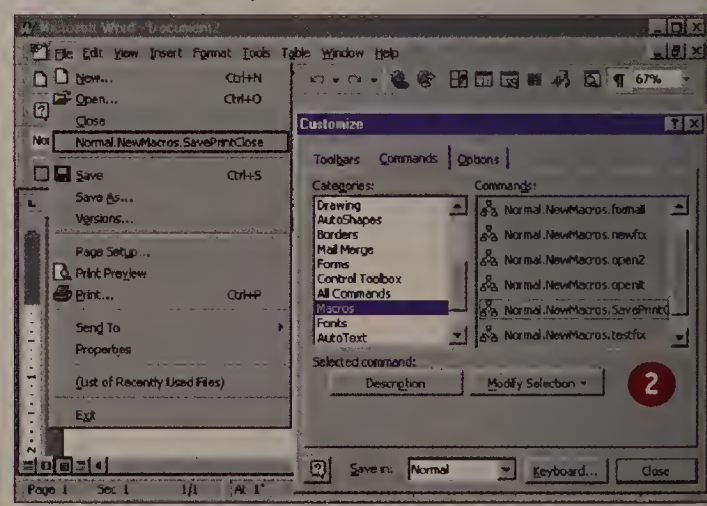


FIGURE 1: MENU MACROS IN A MINUTE: (1) To place a macro as a menu item in Word 7, select *Tools•Customize•Menus*; choose menu, position, and name. (2) In Word 97, just drag the macro command to the menu in which you want it.

Nudge Graphics in Word

DRAGGING AND DROPPING a graphics object in Word is easy, but it can be imprecise. Solution: Use Word's built-in "nudging" ability. To move in very small increments, just select the object by clicking on it, and then press the cursor keys to "nudge" it in any direction. For even finer control, hold down <Alt> while pressing the cursor keys to move the object in one-pixel increments. This works in all versions of Word. Hint: If the object is contained in a frame or text box, click the frame or text border to select it.

FIX ERRORS IN WORD'S CUSTOM DICTIONARIES

IT HAPPENS TO almost everyone: While rushing through a spelling check, you mistakenly add a misspelled (or mistyped) word to Word's custom dictionary. From then on, Word doesn't flag that misspelled word as incorrect, so it may go unnoticed. Fortunately, the custom dictionary is a simple text document that you can easily edit. Here's how:

1. Select *Tools•Options.*
2. In Word 97, click the *Spelling & Grammar* tab in the Options dialog box. In Word 6 and 7, click the *Spelling* tab.
3. In Word 97, click *Dictionaries.* In Word 7, click *Custom Dictionaries.* Word 6 users can skip this step.
4. Select *CUSTOM.DIC* or the dictionary you want to change in the Custom Dictionaries list.
5. Click *Edit,* then click *OK* in the advisory dialog box that appears.
6. After Word loads the dictionary, delete any words you added erroneously.
7. Once your edits are finished, select *File•Save,* then *File•Close.*
8. In Word 7 and 97, you'll need to select *Tools•Options,* click the *Spelling & Grammar* tab, and enable *Check spelling as you type* in the dialog box if it was enabled prior to your edits. This is necessary because Word turns this feature off when you edit a custom dictionary.
9. You can also add words to your custom dictionary if you want. Just type them in during Step 6 and save.

DRAG AND COPY TEXT IN WORD

MOST WORD USERS know they can use the mouse to drag a highlighted block of text to a new location in a document, but did you know you can also copy selected text to a new location? Just select the text you want to copy, hold down **<Ctrl>** as you click on the highlighted text (see **FIGURE 2**), and drag the altered mouse pointer to the desired spot. (You will notice that the cursor shape changes to a plus sign when the Control key is held down.) Release the mouse button to finish the job.

Want to copy the text to a location off the current screen? Drag the mouse pointer over the scroll bar until the desired location appears, then move it back over the document and drop the selected text.

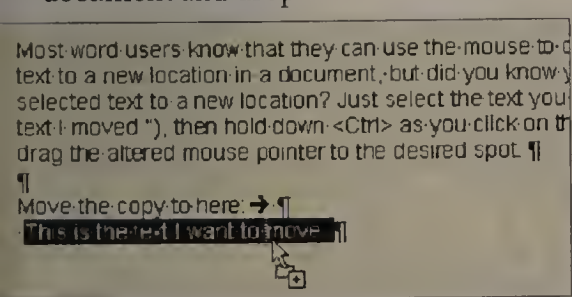


FIGURE 2: HOLD THE CONTROL key when dragging highlighted text to copy it to a new location.

If you misplace the text, you can always press **<Ctrl>-Z** to undo the action and then try placing the text again.

START WORD WITH THE FILE OPEN DIALOG BOX OPEN

IF THE FIRST thing you do after starting Word is select *File•Open* to locate an existing file, why not force the program to display the File Open dialog box at start-up? It's easy to do with the help of a self-running macro that automates the task. When Word starts, the program automatically runs any macro that you've named "Autoexec," so we'll use this macro to automate our start-up routine. Thanks to Frank Dacey of Islamorada, Florida, for suggesting this tip.

Word 97:

1. With Word running, select *Tools•Macro•Macros.*
2. Type **Autoexec** in the 'Macro name' field of the dialog box, then click *Create.*
3. Carefully type the single line of text below, between the Sub Autoexec() and End Sub lines in the macro editor. Include punctuation as shown.

```
Dialogs(wdDialogFileOpen).Show
```

4. Select *File•Save Normal,* then *File•Close and Return to Microsoft Word.*

Word 6 and 7:

1. With Word running, select *Tools•Macro.*
2. Type **Autoexec** in the Macro Name field of the Macro dialog box, and click *Create.*
3. Carefully type the three lines of text below (including punctuation characters), between the Sub MAIN and End Sub lines, into Word.

```
Dim dlg As FileOpen
button = Dialog(dlg)
If button <> 0 Then
FileOpen dlg
```

4. Select *File•Close* and click *Yes* when you are prompted to save the changes you've made in the new macro.

Once you have created the macro, Word will display the File Open dialog box each time you start up the program, using the default document directory. If you don't want to open an existing document, just click *Cancel,* and you will be presented with a blank document.

Note: To change the default document directory—to which the File Open dialog box takes you—select *Tools•Options,* then click the *File Locations* tab. Next select *Documents* in the 'File types' list. Then click *Modify,* choose a new directory as the default (you may need to navigate through your hard disk to locate the desired folder), and click *OK* twice to return to the document window.

We welcome your questions and tips and pay $50 for published items. PC World *Contributing Editor George Campbell (www.osomin.com) is a contributor to* The PC Bible *(Peachpit Press, 1995).* *See page 14 for contact information.* ■

Do Your Taxes in Word

IF YOUR TAX SITUATION is simple and you can use IRS forms 1040, 1040A, or 1040EZ to file your federal income taxes, why not do them in Word? Downloadable versions of these forms in a format compatible with Word 6.0 and later are available for free on the Web. You just tab through the form and associated worksheets, fill them in, and the calculations are done automatically. When you're done, you can save the resulting document and print the completed form for filing. E.Smart offers such forms on its Web site at www.etaxforms.com (see **FIGURE 3**). Some state income tax forms are also available there, along with a page where you may request other tax forms.

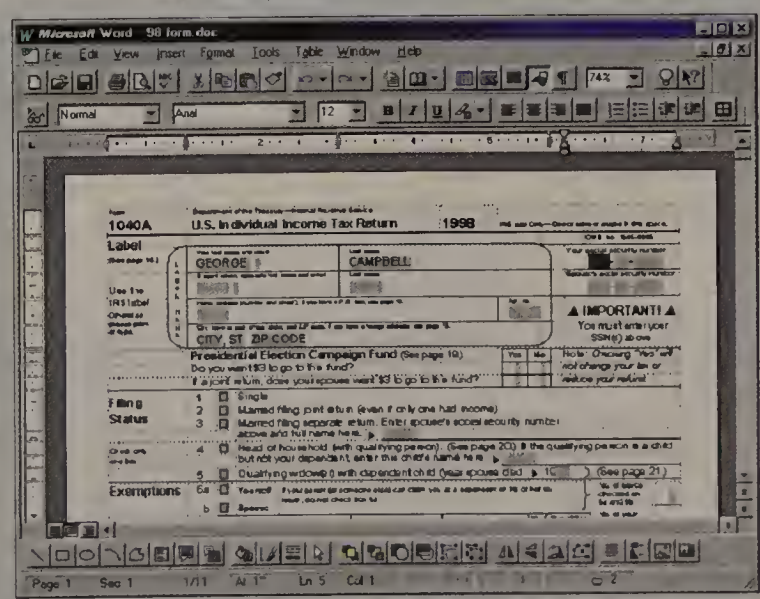


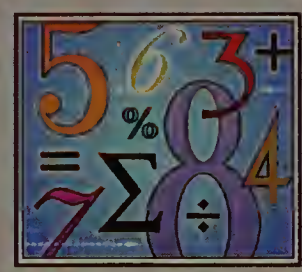
FIGURE 3: DO YOUR FEDERAL TAXES in Word. Forms like this one from E.Smart do all the calculations automatically.

Do-It-Yourself Y2K Date Fixes in Excel

WITH ALL THE FUROR over potential year 2000 problems, you may worry about the validity of dates in your spreadsheets. Indeed, entering two-digit years can cause trouble even when your system *is* Y2K compliant. If you enter '12/5/29', for example, Excel 97 will read it as December 5, 2029; but enter '12/5/30', and Excel will think you mean December 5, 1930. Excel 97 arbitrarily assumes that two-digit years between 00 and 29 refer to the years 2000 and beyond, while those between 30 and 99 should be assigned the prefix 19.

You can avoid this problem if you use four-digit years for all your dates (or if you never perform date calculations). But if you do use two-digit abbreviations, you need to make sure your spreadsheet understands them the same way you do.

To identify potential date problems, I've created an add-in for Excel 97 and later versions. It generates a report containing detailed information about each date cell in a worksheet. **FIGURE 1** shows an example of the output. For each date cell, the report lists the address, row, column, and formula (if any), as well as how the date is displayed, the format used, the date's serial number, the year, the month, and the day. In the sample report, cell A29 contains a date in the year 1900. Notice that this cell looks exactly like cell A28 (which contains a date in the year 2000). This type of error is very easy to overlook.



Download a free copy of the DateReport add-in from PC World Online's FileWorld.

TEXT AND VALUES IN ONE CELL

DID YOU KNOW that you could combine text and values in a single cell? For example, if cell A12 contains the value 1435 and you type **="Total: "&A12** into another cell, this second cell will display 'Total: 1435'. The ampersand is a concatenation operator that joins the text with the contents of cell A12. Note: Applying a number format to the cell containing the formula has no effect, because the cell contains text, not a value. As a workaround, use the following Text() function:

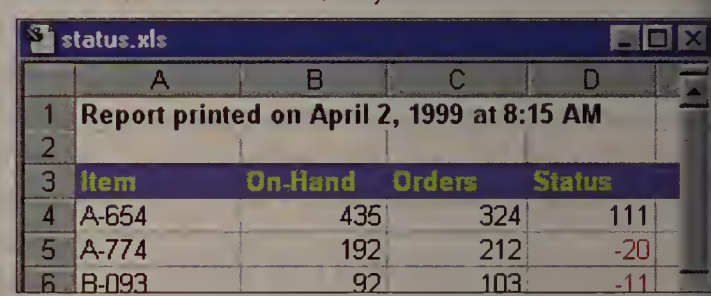
="Total: "&TEXT(A12,"$#,##0.00")

This function will yield 'Total: $1,435.00'.

The second argument for the Text() function consists of a standard Excel number-format string. Here's an example that uses the Now() function (be sure to type it as one sequence, without any line breaks):

="Report printed on "&TEXT (NOW(),"mmmm d, yyyy at h:mm AM/PM")

FIGURE 2 shows how this formula might appear.



	A	B	C	D
1	Report printed on April 2, 1999 at 8:15 AM			
2				
3	Item	On-Hand	Orders	Status
4	A-654	435	324	111
5	A-774	192	212	-20
6	B-093	92	103	-11

FIGURE 2: THE FORMULA IN CELL A1 combines text with a formatted value—in this case, a date and time.

CONDITIONAL AVERAGES

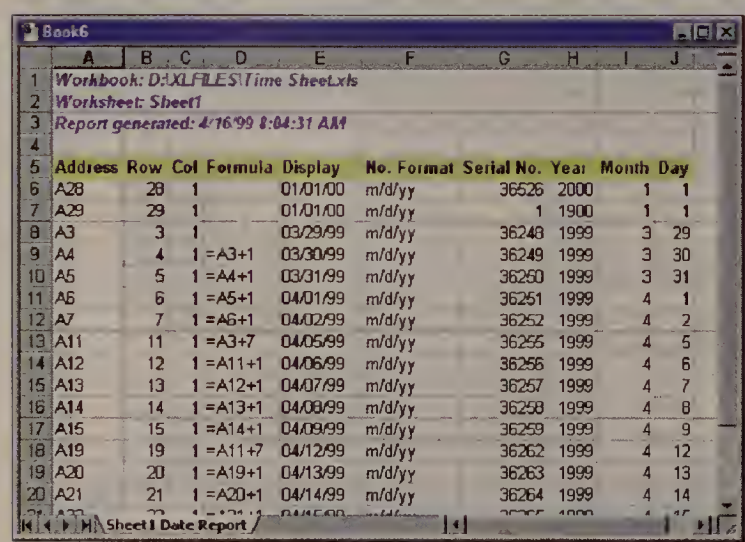
IN THE REAL WORLD, a simple average often isn't adequate for your needs. For example, an instructor might calculate student grades by averaging a series of test scores but omitting the two lowest scores. Or you might want to compute an average that ignores both the highest and lowest values. In cases such as these, the Average() function won't do, so you must create a more complex formula. The following Excel formula computes the average of the values contained in a range named 'scores', but excludes the highest and lowest values:

=(SUM(scores)-MIN(scores)-MAX(scores))/(COUNT(scores)-2)

Here's an example that calculates an average excluding the two lowest scores:

=(SUM(scores)-MIN(scores)-SMALL(scores,2))/(COUNT(scores)-2)

(To use these formulas in 1-2-3, just add an @ before each function name and remove the = sign before them.)



	A	B	C	D	E	F	G	H	I	J
1	Workbook: D:\XLFILES\Time Sheet.xls									
2	Worksheet: Sheet1									
3	Report generated: 4/16/99 8:04:31 AM									
4										
5	Address	Row	Col	Formula	Display	No. Format	Serial No.	Year	Month	Day
6	A28	28	1		01/01/00	m/d/yy	36526	2000	1	1
7	A29	29	1		01/01/00	m/d/yy	1	1900	1	1
8	A3	3	1		03/29/99	m/d/yy	36248	1999	3	29
9	A4	4	1	=A3+1	03/30/99	m/d/yy	36249	1999	3	30
10	A5	5	1	=A4+1	03/31/99	m/d/yy	36250	1999	3	31
11	A6	6	1	=A5+1	04/01/99	m/d/yy	36251	1999	4	1
12	A7	7	1	=A6+1	04/02/99	m/d/yy	36252	1999	4	2
13	A11	11	1	=A3+7	04/05/99	m/d/yy	36255	1999	4	5
14	A12	12	1	=A11+1	04/06/99	m/d/yy	36256	1999	4	6
15	A13	13	1	=A12+1	04/07/99	m/d/yy	36257	1999	4	7
16	A14	14	1	=A13+1	04/08/99	m/d/yy	36258	1999	4	8
17	A15	15	1	=A14+1	04/09/99	m/d/yy	36259	1999	4	9
18	A19	19	1	=A11+7	04/12/99	m/d/yy	36262	1999	4	12
19	A20	20	1	=A19+1	04/13/99	m/d/yy	36263	1999	4	13
20	A21	21	1	=A20+1	04/14/99	m/d/yy	36264	1999	4	14

FIGURE 1: SAMPLE OUTPUT FROM the DateReport add-in shows detailed information about each date cell in a worksheet.

Create a Linked Picture

EXCEL 5 AND LATER versions provide a tool for creating a live "snapshot" of a range and placing it anywhere you like. To use it, select a range of cells and choose *Edit•Copy*. Then hold down the <Shift> key and click *Edit•Paste Picture Link*. The result is an image of the selected range that will reflect any subsequent changes to the source. This technique is great for printing noncontiguous ranges on a single page. After creating a series of linked pictures of ranges, set them to print on one page.

You'll find files mentioned in this article at www.fileworld.com/magazine. We welcome readers' questions and tips and pay $50 for published items. Contributing Editor John Walkenbach is the author of Excel 2000 Bible *(IDG Books, 1999) and maintains The Spreadsheet Page (www.j-walk.com).* *See page 14 for contact information.* ■

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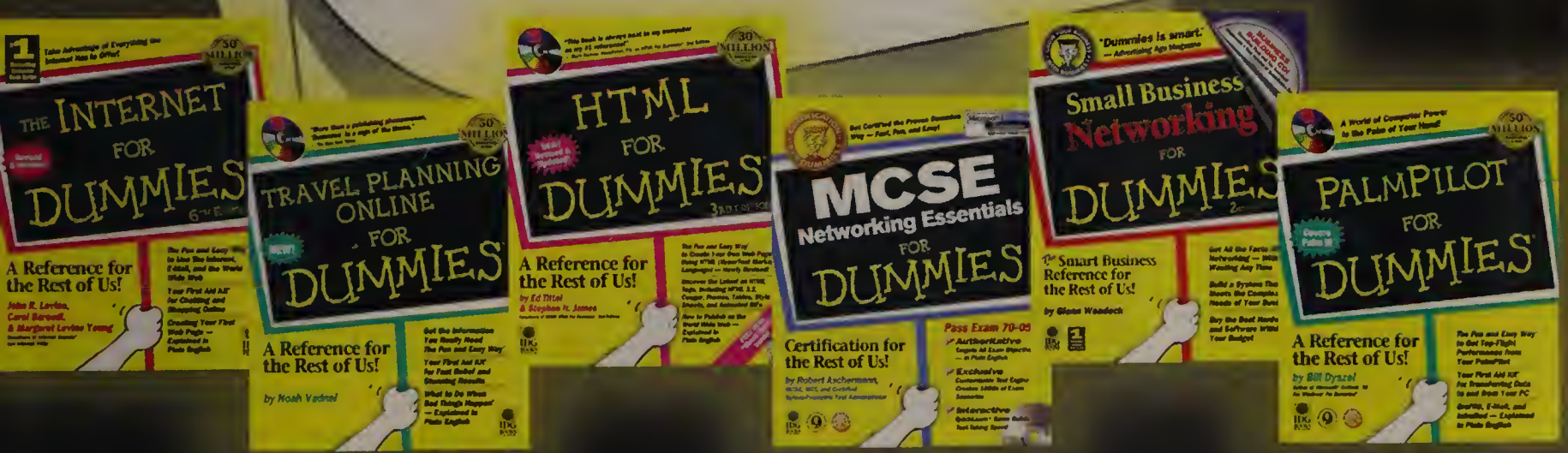

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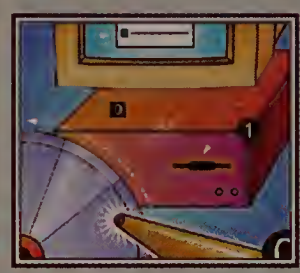
Create an Emergency "Super" Disk

YOU SIT DOWN at your computer and flip on the power switch, but instead of Windows' familiar sky-blue colors, you get a black screen. A knot forms in your stomach as you wonder what may have gone wrong. Maybe it's just a few corrupt files, or maybe it's—gulp—a bad hard disk. Either way, you pop your copy of Windows' start-up disk into the floppy drive (you *did* make one for emergencies, didn't you?), then reboot and use the convenient troubleshooting tools included with Windows 95 and 98 to track down and fix the problem. Right?

Not always. If the damage is serious and you can't run the full version of Windows or access the recovery utilities on your hard disk, then booting from your rescue disk can leave you stranded at the DOS prompt. You're left with a handful of DOS utilities on your emergency floppy and only a fifty-fifty chance of being able to access your CD-ROM drive. The alternative: Create a better-equipped rescue disk. Here's what to do.



If you don't have one already, make a copy of Windows' start-up disk by clicking *Add/Remove Programs* in the Control Panel of Windows 95 or 98 and selecting the *Startup Disk* tab (see **FIGURE 1** on page 294). Click the *Create Disk* button and follow the prompts. Booting from this rescue disk brings up a DOS prompt from which you can attempt to access your hard drive. First type **c:** and press **<Enter>**, and then run Windows by typing **win** at the prompt. Once launched, Win 98 includes numerous diagnostic tools for targeting problems (Win 95 does too, but not as many). If Windows won't start up, you'll have to use DOS utilities. Both Windows 95 and 98 start-up disks contain DOS versions of basic utilities like ScanDisk, Fdisk, and Format.

As you troubleshoot you may need other files, such as your system's CD-ROM drivers or Windows' configuration files. Most important are your system's DOS CD-ROM drivers. To repair damaged Windows files (or to wipe your disk clean and start over), you may need to reinstall Windows from the CD-ROM. And to read your CD-ROM drive in DOS, you must install the drive's DOS drivers. If you're using Windows 95, you'll need to have copied the drivers to your start-up disk and then referenced them in autoexec.bat and config.sys files.

Most CD-ROM drives come with a driver disk that contains the files and instructions you'll need. If you can't find a driver disk, the files may already be installed on your hard drive. In the config.sys file, you'll find the CD-ROM drivers in a line that starts 'device='; in autoexec.bat, check for the line containing 'mscdex.exe', the application that connects DOS to the CD-ROM drive. Those lines tell you the locations and the names of the driver files.

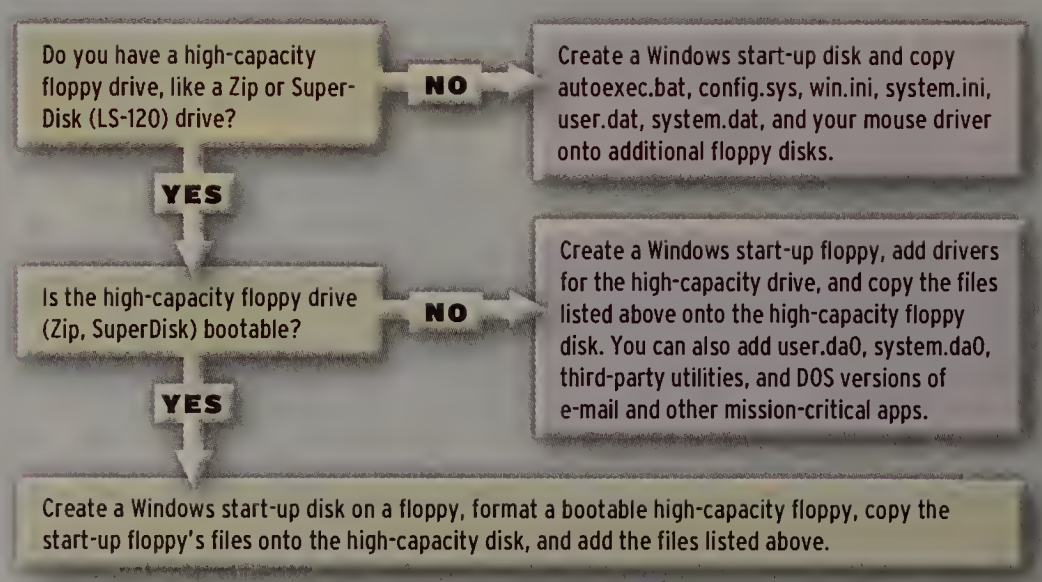
The Windows 98 start-up disk comes with generic CD-ROM drivers that work with most drives, but there's no guar- ▶

PC Card Removal Etiquette

ONE OF THE GREAT Windows 98 time-savers for busy road warriors is the ability to hot-swap PC Cards while your system is running. But to avoid systems from hanging, make sure you follow the proper procedure before removing it. Click the *PC Card* icon in Windows 98's system tray to choose the *Socket Status* dialog box. If the icon isn't in the system tray, click the *PC Card* icon in Control Panel. Then select the card from the displayed list and click *Stop*. Wait until a message informs you that it's safe to proceed.

Which Files Should You Back Up?

FOR WINDOWS 95, copy mscdex.exe and the drivers for your CD-ROM drive to your start-up disk and add the appropriate references to config.sys and autoexec.bat. For Windows 98, note that some files on the start-up disk won't appear until you've booted with it. Some PC manufacturers add their own files to their start-up disks. Follow this decision tree to determine what files you should copy to your start-up disk or other emergency floppies.



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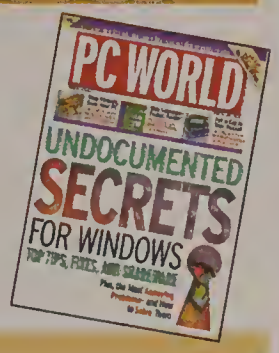

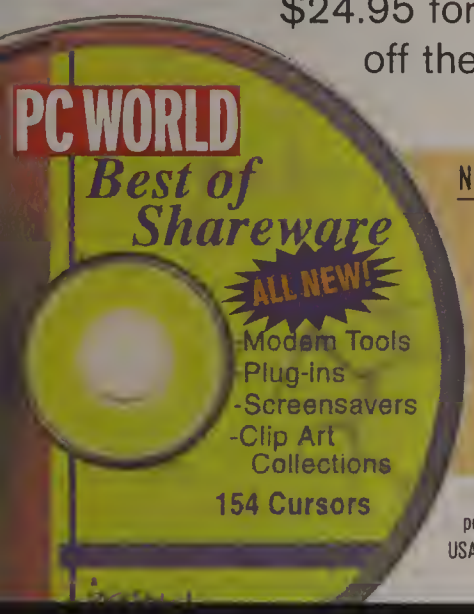

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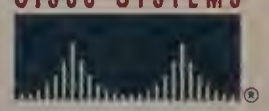

EMPOWERING THE INTERNET GENERATION℠

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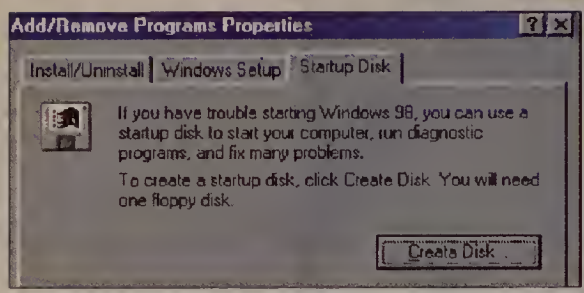

FIGURE 1: CLICK THE Startup Disk tab in Add/Remove Programs to find the Create Disk button.

antee that they'll work with yours. To see if your CD-ROM drive will accept the drivers, insert a CD-ROM in the drive, boot from your Windows 98 start-up disk, and type the CD-ROM drive's letter designation. Note: The start-up disk creates a ramdrive (a virtual disk in memory) with its own drive letter where it stores DOS utilities. Because the drive letter that it uses may not be the one you expect, type the **dir** command to display the files on the inserted CD.

BEEF UP YOUR BOOT DISK

YOU CAN STRETCH your 1.44MB start-up disk to hold more than 100MB if you have a Zip or SuperDisk (LS-120) drive. See if you can fit its DOS drivers—usually included with the drive on a separate disk—onto your start-up floppy. If so, you can access as many multimegabyte files (such as Windows Registry backups) as you like when you boot from it.

Of course, if you have a bootable Zip or SuperDisk you can make a 100MB-plus start-up disk and avoid floppy disk space limitations altogether. But not all Zip and SuperDisk drives are bootable; the status of yours depends on the model and the type of connection your drive uses and on the capabilities of your system's BIOS.

Due to a lack of BIOS support, parallel port versions of Zip and SuperDisk drives can't be booted on standard PCs. But the $35 ZppA card from BlueSky Innovations lets you boot your Zip drive from a parallel port. (The ZppA card doesn't work with Zip Plus drives because they use a different protocol.)

If, on the other hand, you have an ATAPI-based Zip or SuperDisk drive that's attached to an EIDE connector on your motherboard, there's a good chance you can make it bootable. Your system will need a BIOS that supports booting from a Zip or SuperDisk. Most PCs made in the last year have such a BIOS.

To check your PC's BIOS, enter the CMOS setup program by restarting your system and pressing the appropriate key, typically <Delete> or <F1>, when prompted. Then search the menus for the 'Boot Drive Sequence' setting. By default it's usually set to 'A:,C:'—which means to first check the A: drive for the operating system, then check the C: drive. If one of the combinations is 'Zip/LS120, C:' or something similar, your system can boot from the new drive types.

If no Zip or SuperDisk selection is available, a software or hardware upgrade may do the trick. For $40 to $60, Unicore offers downloadable flash BIOS upgrades for many motherboard types. The $60 ATA Pro Flash card from Micro Firmware makes ATAPI (EIDE) Zip and SuperDisk drives bootable.

In addition to having the right BIOS, make sure you've selected the correct drive and that it's properly set up. Zip drives more than a year old may not be configurable as the A: drive. Check the jumper diagram on the outside of the Zip drive's case. If you see a 'set to A:' option, make sure the jumper is properly set to it. If there's no mention of A: on the case, the drive can't be used to boot your system.

If your Zip or SuperDisk drive shows up as the A: drive in Windows, then you can use *Add/Remove Programs* to make a start-up disk, just as you would for a floppy. Most SuperDisk drives do show up as the A: drive (since they double as floppy drives). Most systems with Zip units, however, also have a floppy drive, which is designated as the A: drive, and thus they assign the Zip drive a higher letter. That means you'll have to create a start-up floppy, format a bootable Zip disk, and copy the start-up disk's files to the Zip disk.

ROOM TO SPARE

NOW THAT YOU'VE got a 100MB start-up disk, what do you put on it? In addition to the Win 98 utilities, you can add third-party recovery utilities. Norton Utilities 4.0 offers three helpful DOS programs—Norton Disk Doctor for fixing your hard disk; Norton Rescue, which saves and recovers CMOS settings, boot records, and partition data; and Norton Diagnostics, which examines your entire system. (For more on recovery programs, see this month's *Answer Line*, page 268.)

There's also enough space on your disk for all your key configuration files. Autoexec.bat, config.sys, system.ini, and win.ini take up little room, but Windows Registry files, as well as user.dat and system.dat, can gobble up megabytes. Windows 98's Backup utility—select *Programs•Accessories•System Tools•Backup*—makes it easy to create and update a permanent copy of these files each time you add hardware or software to your system.

And finally, you can add DOS versions, if you can find them, of critical software apps such as e-mail or network software.

If you have a Zip drive, consider adding Norton's Zip Rescue, a free utility that places a *full working copy* of your Windows 98 installation on a Zip disk and lets you run applications on your hard disk—assuming those files are healthy and readable. Better yet, your Zip drive doesn't have to be bootable in order for you to use Zip Rescue. Download it at www.iomega.com/software/index.html?nzr.

Find more tips on PC World Online at www.pcworld.com/heres_how. Kirk Steers is a PC World *contributing editor. We pay $50 for published questions and tips. See page 14 for contact information.* ■

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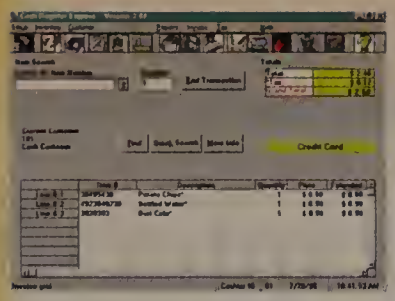

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Install a New Graphics Card

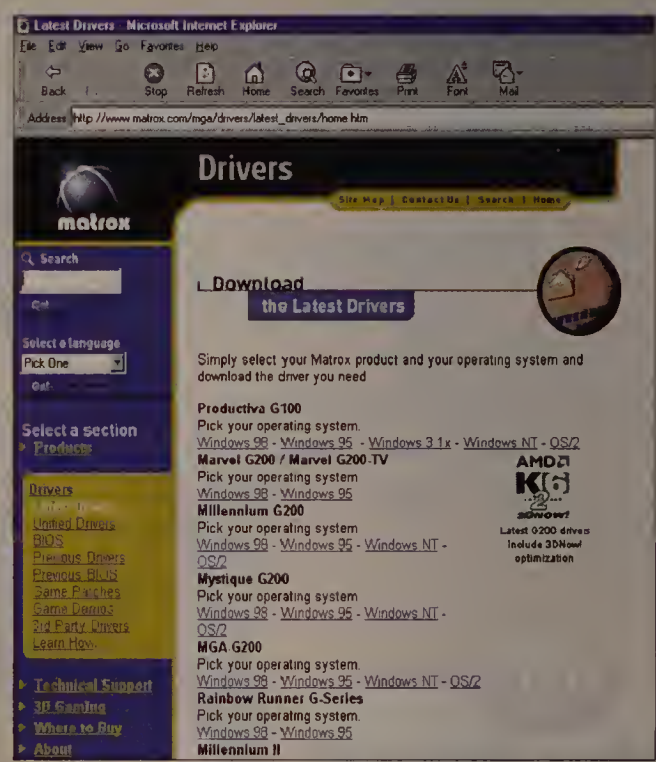
SURE, A NEW processor or extra RAM can speed up your PC's handling of productivity applications, but to take full advantage of today's graphics-intensive Windows apps and the latest generation of hot 3D action games, a new graphics card can do wonders. The good news is that as graphics cards have become faster and more powerful, prices have continued to fall. Today, a $100 to $150 graphics card will run rings around a similarly priced card from last year.

Replacing a PC's graphics controller is one of the most frequent upgrades computer owners undertake, and one of the easiest. Major card makers include such vendors as ATI (www.atitech.com), Diamond (www.diamondmm.com), Hercules (www.hercules.com),Intergraph (www.intergraph.com/ics), Matrox (www.matrox.com), Real 3D (www.real3d.com), and STB (www.stb.com). For more details about specific boards, see *Top 10 Graphics Boards*, page 253, or PC World Online's Top 400 at www.pcworld.com/top400.

If you decide to tackle this project, begin by finding out whether your PC has a PCI or AGP slot. Older machines are likely to have a PCI slot, but newer machines, especially Pentium II–based systems, tend to have a single Accelerated Graphics Port slot, which delivers slightly better graphics performance. Note that some computers with AGP graphics lack an AGP slot.

1 Get the latest driver. The driver that controls your new graphics card performs a crucial function in getting maximum performance and reliability from the card. Fortunately, graphics card companies upgrade their drivers regularly. Before you install your new card, go to the vendor's Web site and check the file date on the latest driver. If the driver on the Web site is newer than the one on the floppy disk or CD-ROM that came with your card, download it, and note the folder on your hard disk where you store it. (In most cases, you'll need either to extract the needed files from a compressed ZIP folder or to run an .exe file that will automatically extract the files.) And before you begin, check for a readme file that may contain critical information about installation.

It's also a good idea to back up all your data in case something goes wrong.

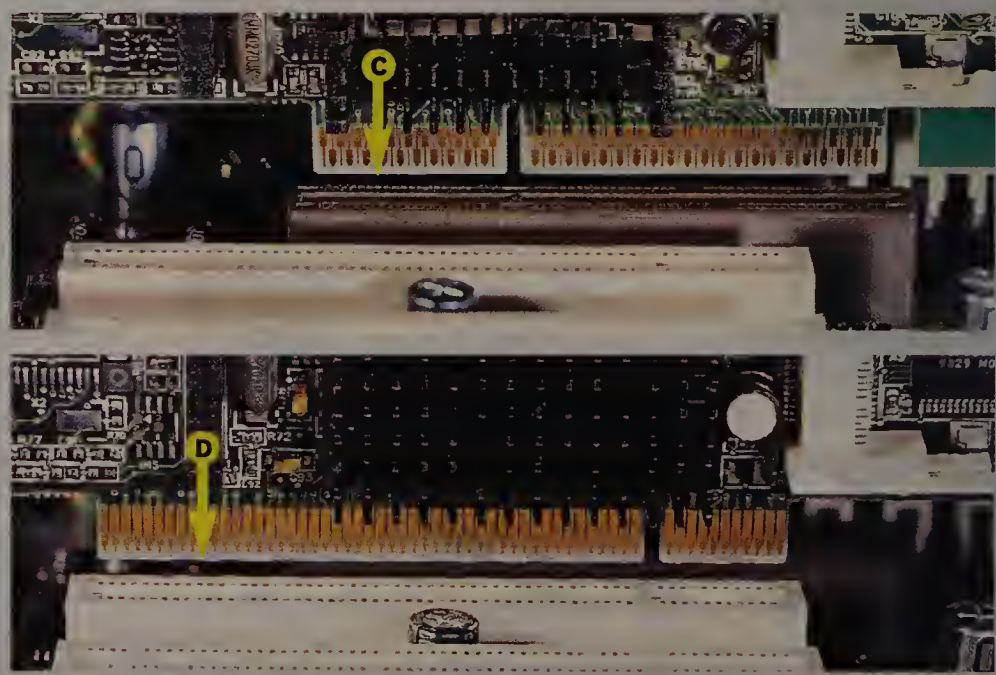


2 Swap the cards. Power down your PC, disconnect the monitor connector from the rear of the graphics card, and take off the PC's cover.

Remove the screw that holds the existing graphics card, touch part of the system case to ground yourself, and carefully pull out the card.

Identify the appropriate slot—AGP (A) or PCI (B). Align and insert the new card, as shown for AGP (C) or PCI (D), and then tighten the screw that holds it in.

Hook up the monitor cable to the rear connector on the graphics card. Don't replace the cover on your computer just yet.



Instead, they have an AGP graphics controller chip mounted directly on the motherboard; if your PC has such an integrated graphics chip, you'll have to disable that chip and upgrade your PC's graphics adapter with a PCI card.

The decision about which card to buy also depends on what you intend to do with your system. Standard business applications (including graphics apps such as Microsoft PowerPoint and Adobe Photoshop) use only 2D graphics, whereas games require high-performance 3D. All of today's cards handle both 2D and 3D, but some are better than others at each task. For example, the Real 3D StarFighter, designed mainly for games, provides excellent 3D performance but only average performance on 2D applications. Other boards compromise in both categories to deliver a happy medium, and still others are optimized for both. For example, the PC World Test Center rates the Matrox Millennium G200 card (the graphics board we used in our step-by-step presentation below) as an excellent performer in both 2D and 3D applications.

The amount of memory that comes with a graphics card is no longer a major issue. With few exceptions, most boards these days include at least 8MB of RAM—more than enough to display True Color (16.8 million colors) at resolutions up to 1024 by 768 and do a decent job keeping up with the performance needs of most games. But if you're into the latest games that feature heavy-duty 3D graphics, consider the newer cards that have 12MB or 16MB of RAM, such as the STB Velocity 4400. With 3D games, more memory permits greater realism.

Many cards also offer extras such as a TV tuner, a DVD decoder, or a port for connecting your PC to a television. Choose your features based on the applications you'll use.

Finally, to take advantage of your new card's highest-resolution graphics modes, consider buying a new monitor.

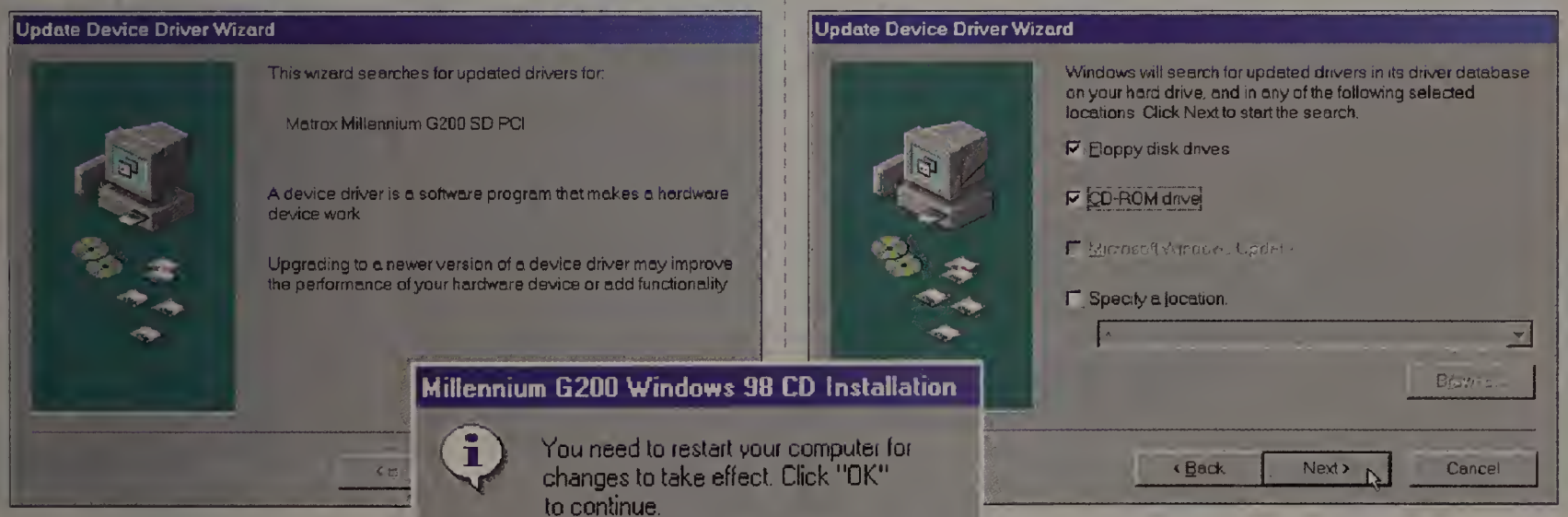
Here are the steps you should follow to upgrade your graphics card.

Stan Miastkowski is a PC World *contributing editor.* ■

3 Install the software. Turn on your PC. Eventually, you should see a message flash briefly on the screen saying that Windows has detected new hardware and is installing software for it.

The exact screens you'll see will depend on the version of Windows you use. Read the screens carefully and follow the directions. If you're using an updated driver (see step 1), specify the location where you stored the driver. If you're using the drivers that came with your card, insert the floppy disk or CD-ROM. Windows 98 will automatically look for a floppy disk or CD-ROM if you check the correct boxes; under Windows 95 you'll need to specify the driver's location or use the Browse button to find it.

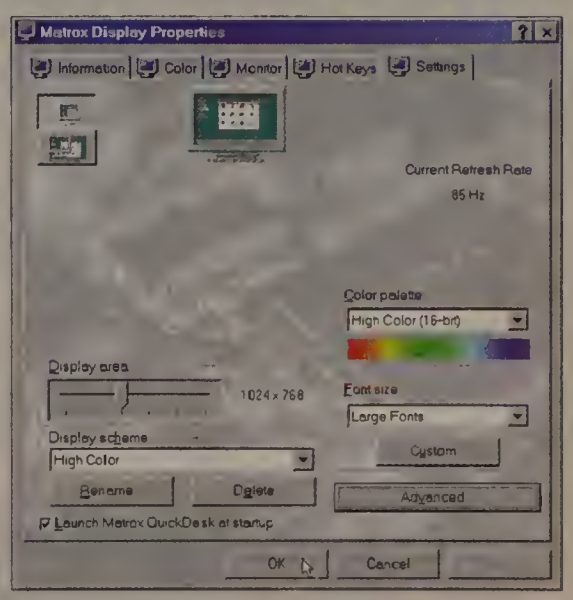
You may be given the option of installing additional features or utilities. You may also be asked to insert your original Windows 9*x* CD-ROM. Eventually, you'll need to restart your computer.



4 Tweak the settings. After you restart your PC, it should come up in a default graphics mode. The settings that you choose and how you choose them will depend on the graphics card you installed. Of course, check your new card's manual first for directions, but it'll likely tell you to select *Start•Settings•Control Panel*, double-click *Display*, and click the *Settings* tab. Use the 'Color palette' and 'Display area' sliders to set the color depth and resolution. If you're not sure which settings your monitor can handle, try various combinations. Windows will test each setting and prompt you to make sure that it works.

Some cards, such as the Matrox Millennium G200 shown here, install their own custom utilities, which you access from an icon in the Windows 9.*x* taskbar's system tray. Others install their own custom icon in the Control Panel.

If you experience problems—say, you can get only standard VGA resolution—check your cable connections, verify that the card is secure in its slot, and then try reinstalling the drivers.



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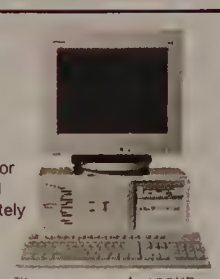

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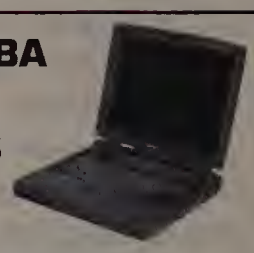

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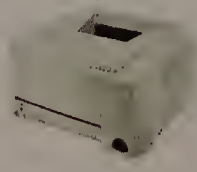

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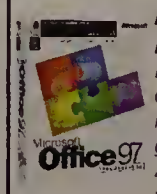

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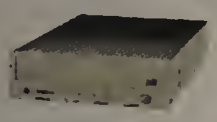

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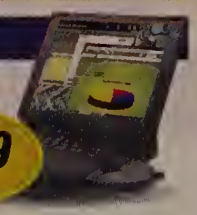
IBM ThinkPad 390



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#42428	TP600E	366 PII MMX	64	6.4GB	0V0	13.3" TFT	56K	$4,149
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#42441	TP770Z	366PII MMX	128	14.1GB	0V0	14.1" TFT	56K	$4,569
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#33235	1700	266 PII MMX	32	4.0GB	24X	13.3" TFT	56K	Win 95	$2,74
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New Armada 7800 Series									
#35469	7800	300 PII MMX	64	8.0GB	DVD	14.1" TFT	—	Win 95	$4,64
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#42537	PCGF180	333PII MMX	64	4.3GB	DVD	14.1" TFT	V.90	Win 98	$2,499
#42538	PCG838	366PII MMX	64	6.4GB	DVD	13.3" TFT	V.90	Win 98	$2,999
#42548	PCGF190	366PII MMX	64	6.4GB	DVD	14.1" TFT	V.90	Win 98	$3,499
#42559	PCG505TS	300P MMX	64	4.3GB	—	10.4" TFT	V.90	Win 98	$1,999
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#40904	1260	333 AMD-K6-2	64	4.0GB	24X	12.1" TFT	56K	Win 98	$1,59
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#38845	330	350 PII MMX	64	10GB	40X	T/D	Win 98	$1,419
#38848	330	450 PII MMX	64	10GB	DVD	T/D	Win 98	$1,719
Deskpro EP Series								
#42176	4300	400 Celeron MMX	32	4.3GB	—	T/D	Win 95	$859
#42177	10000CDS	400 Celeron MMX	64	6.4GB	—	T/D	Win 95	$1,119
#36296	4300	350 PII MMX	64	4.3GB	—	T/D	Win 95	$1,129
#36314	10000CDS	400 PII MMX	64	10.0GB	32X	T/D	Win 95	$1,479
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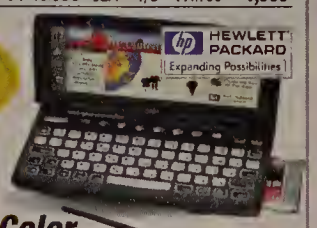

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- 10MB ROM
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#40894*	5240	400 AMD-K6-2	64MB	10GB	40X	56K	MT	Win 98	$999
#43313	5280	450 AMD-K6-2	64MB	12GB	40X	ADSL	MT	Win 98	$1,299
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#41203	6470Z	400 PII MMX	96MB	12.7GB	32X	56K	Win 98	$1,399
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#42410	6275H1U	333 Celeron	32MB	4.2GB	—	W98	DT	$87
#42409	6275G3U	366 Celeron	32MB	4.2GB	—	W98	DT	$94
#42395	6275B9U	350 PII	32MB	4.2GB	—	W98	DT	$1,04
#42396	6275FIU	366 Celeron	32MB	4.2GB	32X	W98	DT	$1,09
#42133	628241U	350 PII	32MB	4.2GB	—	W98	MI	$1,09
#42392	6275B4U	350 PII	64MB	4.2GB	—	NT	DT	$1,17
#42397	6275M2U	400 PII	32MB	4.2GB	—	W98	DT	$1,17
#42394	6275B7U	350 PII	32MB	4.2GB	32X	W98	DT	$1,19
#42137	62B761U	400 PII	32MB	4.2GB	—	W98	MI	$1,19
#42411	6275G1U	366 Celeron	64MB	8.4GB	32X	W98	MT	$1,22
#42139	628769U	400 PII	64MB	8.4GB	32X	NT	MI	$1,54
#42140	628785U	450 PII	64MB	8.4GB	32X	W98	MI	$1,62
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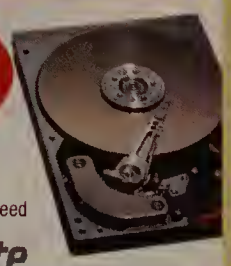

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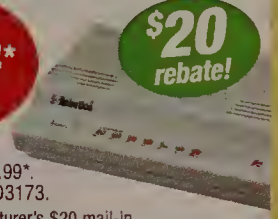

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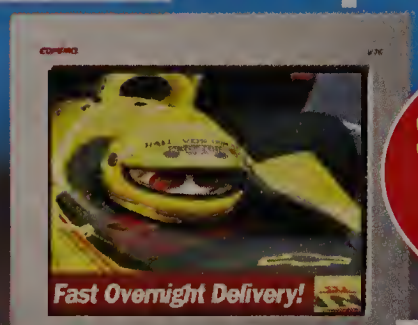

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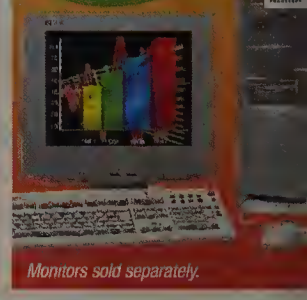

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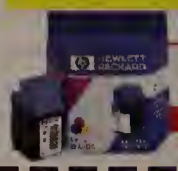

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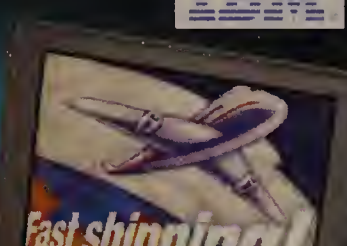

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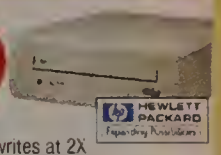

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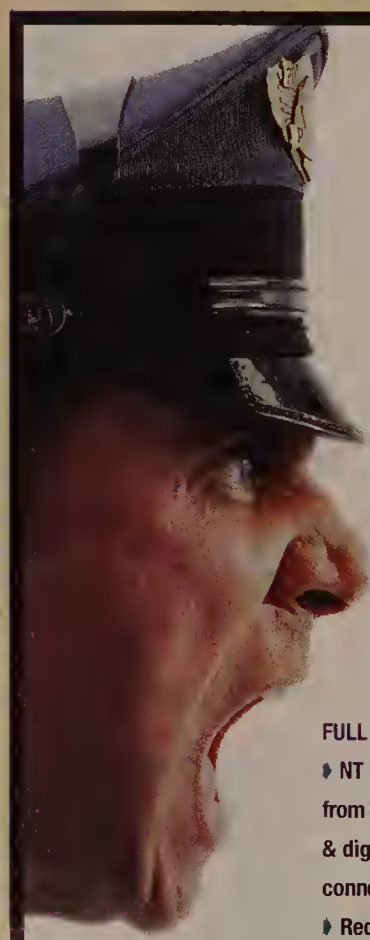

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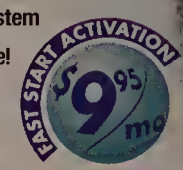

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Max. cost @ $2.00/domain	N/A	N/A	$50.00	$50.00	$150.00	$500.00	$2000.00
Max. monthly cost	$14.95	$19.95	$109.95	$139.95	$299.95	$859.95	$3999.95
Gross profit @ $19.95/domain	N/A	N/A	$498.75	$498.75	$1,496.25	$4,987.50	$19,950.00
Your monthly net profit	N/A	N/A	$388.80	$358.80	$1,196.30	$4,127.55	$15,950.05
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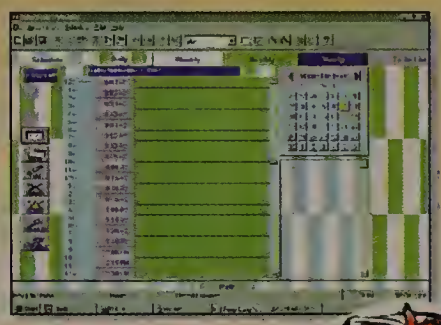

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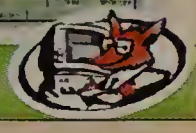

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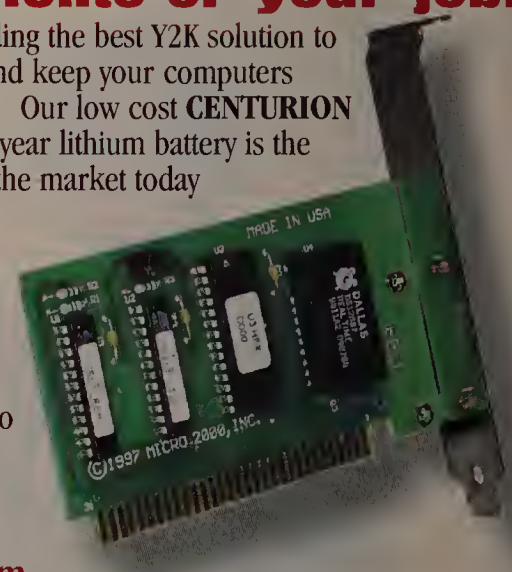

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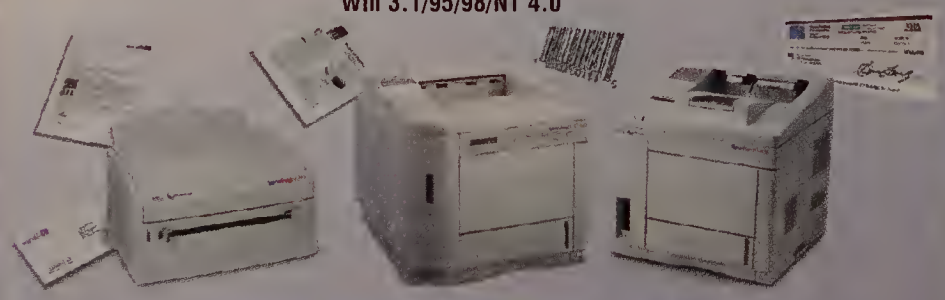

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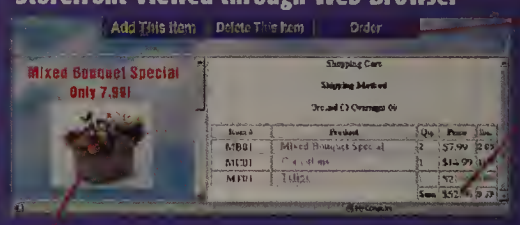

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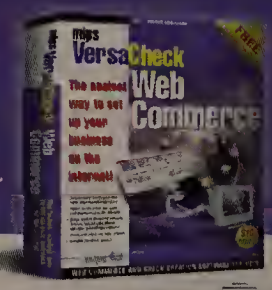

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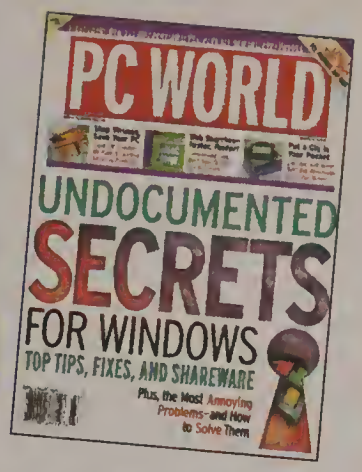

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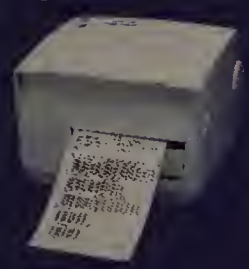

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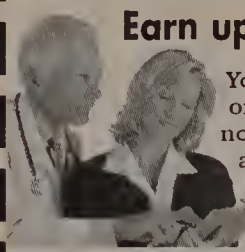

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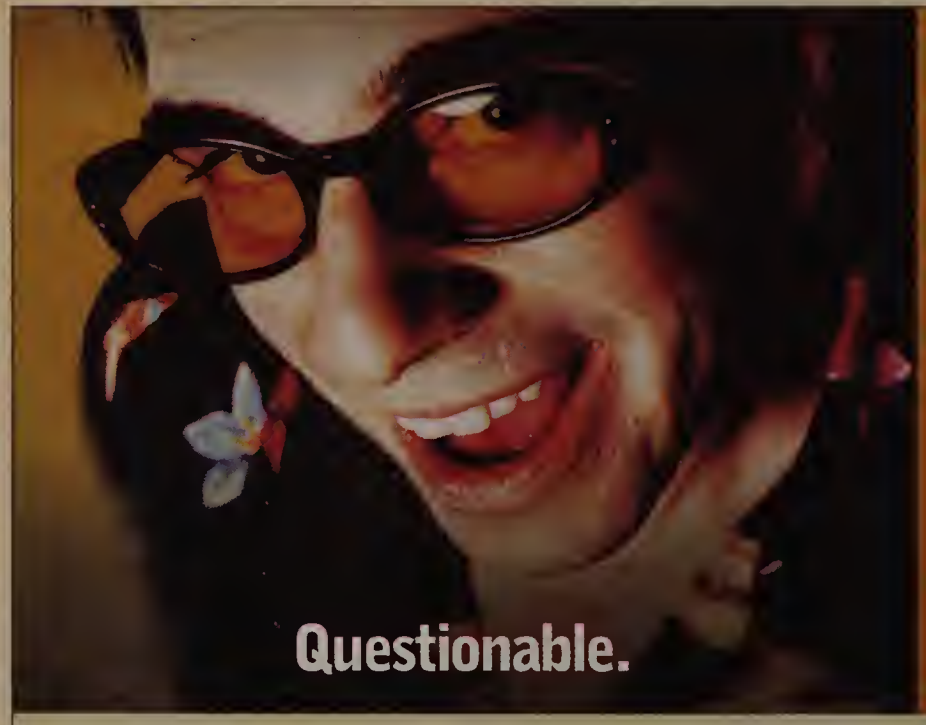

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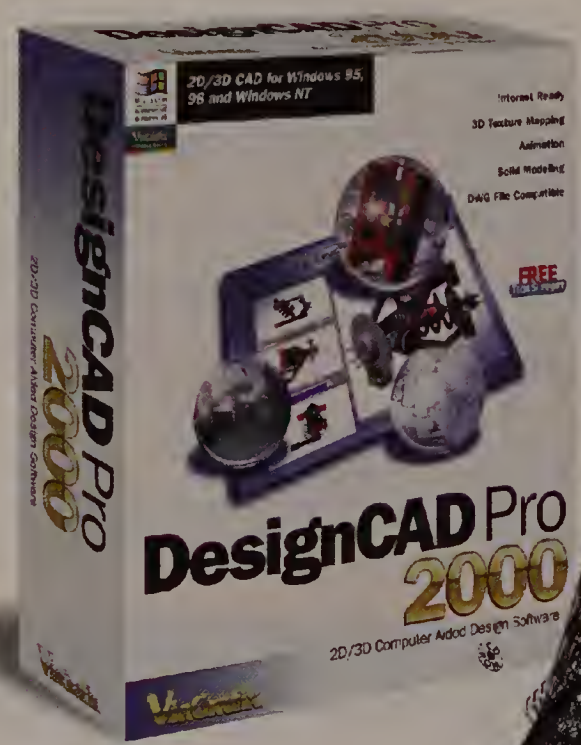

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DWG/DXF MULTI-VERSION SUPPORT	YES!	YES	YES	NO	YES
VRML SUPPORT	YES!	NO	NO	YES	NO
3D PRIMITIVES	12	11	0	3	11
3D ANIMATION	YES!	NO	NO	NO	NO
TEXTURE MAPPING	YES!	YES	NO	NO	YES
ANTI-ALIASING	YES!	YES	NO	NO	YES
SURFACE HAMMER	YES!	NO	NO	NO	NO
SURFACE INTERSECTION	YES!	YES	NO	NO	NO
SELECT HIDDEN EDGES	YES!	YES	NO	NO	YES
3D KEYBOARD CURSOR MOVEMENT	YES!	NO	NO	NO	NO
AUTO-WELD SHAPES TO ONE PERIMETER	YES!	NO	NO	NO	NO
CUT ONE PLANE FROM ANOTHER	YES!	YES	NO	NO	YES
DIRECT SCANNER SUPPORT	YES!	NO	NO	YES	NO
IMAGE AUTO-TRACE	YES!	NO	NO	YES	NO
DIGITIZER TRACING SUPPORTED	YES!	YES	YES	NO	NO
ZOOM ALL VIEWS TO SELECTION	YES!	NO	NO	NO	YES
PANELING: MULTI-PAGE PRINTER OUTPUT	YES!	NO	NO	YES	NO
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Styles: Gender Changers
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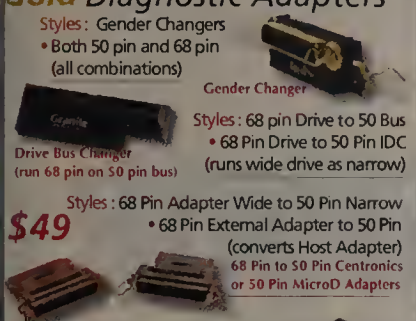

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16Meg	35	35	39	44		
32Meg	55	68	59	69		
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2 x 32 8 mg	19	19	19
4 x 32 16 mg	49	49	–
8 x 32 32 mg	89	89	–
16 x 32 64 mg	159	159	–
1 x 32 4 mg EDO	10	10	–
2 x 32 8 mg EOO	17	17	–
4 x 32 16 mg EDO	45	45	–
8 x 32 32 mg EDD	89	89	–
16x32 64 mg EDD	119	119	–
256 x 36	–	14	14
512 x 36	–	3	–
256 x 32	–	3	–
512 x 32	–	4	–
1 x 36 4 mg	14	14	14
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Pentium II 266B MHZ	234	Pentium 133/150	59/79	K6-2-333/-300/-266MHZ	129/109/89

DELL MEMORY

Dimension XPS D233, D266, D300, D333 (SDRAM)	32/64/128Meg	59/99/199
Dimension XPS D233, D266, D300, D333 (ECC)	32/64/128Meg	63/119/229
Dimension XPS 133S, 166S, 200S, P133V, P200V (SDRAM)	16/32Meg	32/59
Dimension XPS R350, R400, R450 (PC-100)	64/118Meg	119/229
Dimension XPS V333, V333C, V350 (PC-100)	32/64/128Meg	119/229
Dimension XPS M166A, M200A, M200S (SDRAM)	16/32Meg	32/59
Dimension XPS Pent II H233, H266 (EDO pairs)	8/16/32Meg	19/36/79
Dimension XPS P100C, 120C, 133C, 166C (EDD pairs)	4/8/16/32Meg	11/19/36/79
Dimension XPS P60, P75, P90, P100 (FPM pairs)	4/8/16/32Meg	10/19/39/79
Optiplex GM GMT P75, P90, P100, P120, P133, P166 (EDO pairs)	4/8/16/32Meg	11/19/36/79
Optiplex GNT, N Series (EDD Dimm)	32/64/128Meg	49/99/199
Optiplex GX Pro 180, 200 (SDRAM)	32/64/128Meg	59/99/199
Optiplex GXI (EDD ECC)	32/64/128Meg	64/119/239
Optiplex GX1 (ECC PC100)	32/64/128Meg	59/119/224
Optiplex GN/GNT 166, 200, 233 (EDO Dimm)	32/64/128Meg	49/99/199
Optiplex XL, XM, XMT (FPM pairs)	8/16/32Meg	19/44/79
PowerEdge 2100, 2200, 4100, 4200 (EDD, ECC)	32/64/128/256Meg	64/119/239/529
PowerEdge EL, SP, SP2 (FPM pairs)	8/16/32Meg	26/49/98

IBM APTIVA, PC

Aptiva 2136 (EDD, pairs)	4/8/16/32Meg	6/19/49/89
Aptiva 2137, 2140, 2142 (SDRAM)	16/32/64/128Meg	39/59/109/209
Aptiva A, M, 300, 500, 700 Series	4/8/16/32Meg	6/19/49/89
Aptiva C, S,L Series (EDO, pairs)	4/8/16/32Meg	6/19/49/89
Intellistation Models 6888, 6899	32/64/128/256Meg	94/139/279/549
Netfinity		Please Call
PC 300 FPM/PC300 EDD	4/8/16/32Meg	6/19/49/89
PC 300 GL (SDRAM) / PC 300 PL	16/32/128/256Meg	39/69/109/229/519
PC 330 Model 6577 (EDO, pairs)	4/8/16/32Meg	6/19/49/89
PC 350 Models 6581-6585	4/8/16/32Meg	6/19/49/89
PC 350 Model 6586 (pairs)	4/8/16/32Meg	6/19/49/89
PC 350 Model 6587 (EDD, pairs)	4/8/16/32Meg	6/19/49/89
PC 730 Models 6875-6876 (pairs)	4/8/16/32Meg	6/19/49/89
PC 730 Model 6877 (EDO, pairs)	4/8/16/32Meg	6/19/49/89
PC 750 Models 6885-6886 (pairs)	4/8/16/32Meg	6/19/49/89
PC 750 Model 6887 (EDO, pairs)	4/8/16/32Meg	6/19/49/89
PC Server 310 (pairs)	4/8/16/32Meg	6/19/49/89
RISC 6000		Please Call

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IBM NOTEBOOK/LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH/Li-on
Thinkpad i Series	32/64/128Meg	79/149/539	
Thinkpad 310E, ED, 315	16/32Meg	49/79	
Thinkpad 340, 345, 355, C, CS	4/8/16Meg	44/54/79	119/—
Thinkpad 360C, CE, CSE, P, PE	4/8/16Meg	44/54/79	105/—
Thinkpad 365X, 365XD	8/16/32Meg	29/49/79	105/—
Thinkpad 380, 380D, 380E, 385ED, 385XD	16/32/64Meg	49/79/139	119/236
Thinkpad 560, 560E, 560X	8/16/32/64Meg	29/49/79/139	241/—
Thinkpad 600, 770, ED (SDRAM)	16/32/64/128Meg	39/79/139/539	
Thinkpad 700, 720, 750, CL57SX	4/8/16/32Meg	54/79/90/199	140/175
Thinkpad 701, 701C, 701CS	4/8/16/32Meg	18/29/49/89	119/—
Thinkpad 755C,CE,CD,CS,CDV,CSE,CV	4/8/16Meg	44/54/79	140/271
Thinkpad 760C, CD, L, LD	8/16/32Meg	29/49/99	140/271
Thinkpad 760E, ED, EL, ELD	8/16/32Meg	29/44/79	140/271
Thinkpad 760XD, 760XL	8/16/32Meg	29/44/79	140/271
Thinkpad 765D, 765L	8/16/32/64Meg	29/44/79/139	140/271

GATEWAY MEMORY

Dest. Big Screen D5 – SDRAM	16/32/64Meg	29/69/109
Dest. Big Screen D6 – EDO (pairs)	4/8/16/32Meg	6/19/45/89
Family PC w/MMX – SDRAM	16/32/64Meg	29/69/109
G5-166, 200 Prof. System – SDRAM	16/32/64Meg	29/69/109
G5-166M, 200M MMedia System – SDRAM	16/32/64Meg	29/69/109
G6-200 Prof System – SDRAM	16/32Meg	29/59
G6-Prot, M MMedia System – EDO	4/8/16/32Meg	6/19/45/89
Multimedia G-5 Systems – SDRAM	16/32/64Meg	29/69/109
Prot, P-5 Series – SDRAM	16/32/64Meg	29/69/109

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LASER PRINTER MEMORY UPGRADES

AMOUNT UPGRADED	256k	1	2	3	3.5	4	5	8	16	32
Brother 630, 631, 641, 645	–	39	59	–	–	–	–	–	–	–
Canon LBP 430	–	9	–	–	–	14	–	–	–	–
Canon LBP 860, 1260	–	–	9	–	–	14	–	39	59	99
Epson Action Laser 1100, 1600	–	5	9	–	–	14	–	39	59	–
Epson Action Laser II	–	59	–	89	–	–	119	–	–	–
Epson 8000, 1800, 4000, 4100, 4300	–	59	–	89	–	–	119	–	–	–
Epson 1000, 1500, 5000, 5200	–	–	30	–	–	60	–	–	–	–
HP 2, 2D	–	–	59	–	–	79	–	–	–	–
HP 3, 3D, 3P, 2P+	–	–	59	–	–	79	–	–	–	–
HP 4, 4M 4Si, 4SiMX	–	–	9	–	–	19	–	39	–	–
HP 4L	–	29	–	–	–	–	–	–	–	–
HP 4MP, 4P	–	5	14	–	–	19	–	39	–	–
HP 4+, 4M+, 4V, 4MV	–	5	14	–	–	19	–	39	59	99
HP 5, 5M, 5MP, 5N, 5P, 5Si, 5MX	–	5	14	–	–	19	–	39	59	99
HP 5L, 6L	–	–	–	–	–	29	–	44	–	–
HP 6MP, 6P	–	9	19	–	–	19	–	39	59	99
HP Laser Jet 4000, 5000	–	–	–	–	–	21	–	29	49	109
HP Design Jet 200, 220	–	–	–	–	–	19	–	39	–	–
HP Design Jet 230, 250C	–	–	–	–	–	19	–	39	59	99
HP Design Jet 330, 350C	–	–	–	–	–	19	–	39	59	99
HP Design Jet 600, 650C	–	–	–	–	–	19	–	39	–	–
HP Design Jet 650C PS	–	–	–	–	–	19	–	39	59	99
HP Design Jet 700, 750C, Plus, 755	–	–	–	–	–	19	–	39	59	99
HP Deskjet 500, 500C, 510, 550, 560	29	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/PS, 1600C, 1600CM	–	–	–	–	–	19	–	39	59	99
IBM Laser 4019, 4019E	–	–	–	–	109	–	–	–	–	–
IBM Laser 4029, 4037	–	–	–	–	–	49	–	–	–	–
IBM Laser 4039, 4079	–	–	–	–	–	29	–	39	–	–
Lexmark, Optra L, LX, R, RX	–	–	–	–	–	19	–	39	59	99
Lexmark Valuwriter 300, 600	–	29	39	–	–	49	–	–	–	–
Lexmark Winwriter 200, 400, 600	–	29	39	–	–	49	–	–	–	–
Lexmark S Series	–	–	–	–	–	–	–	29	59	99
NEC 95, 97	–	–	59	–	–	–	–	–	–	–
Oki 400E, 400EX, 410E, 410EX	–	75	79	105	–	119	–	–	–	–
Oki 810E	–	–	–	–	–	69	–	89	99	149
Oki 600E	–	70	75	–	–	–	97	–	119	–
Oki 610E	–	70	75	87	–	–	97	–	119	–
Panasonic 4420/4450i	–	–	79	–	–	99	–	–	–	–
Panasonic 4410/4430	–	–	59	–	–	99	–	–	–	–
Panasonic 4450	–	49	–	–	–	–	–	–	–	–
Panasonic 4400/5400	–	49	69	–	–	99	–	–	–	–
Panasonic 4440, 5410	–	69	–	–	–	99	–	–	–	–
Panasonic 6500	–	14	14	–	–	49	–	–	–	–
Sharp 9400, 9460, 9600, 9700E	–	49	59	–	–	99	–	–	–	–
Sharp 9500, E, H, 9700, H	–	49	–	–	–	236	–	–	–	–

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Deskpro 450, 4100, 575, 590, 5100, 5133	4/8/16/32Meg	6/19/49/89
Deskpro 575, 5120, 5133, 5150, 5160 (EDO, pairs)	4/8/16/32Meg	6/19/49/89
Deskpro 2000, 4000, 6000 Series (EDO, pairs)	4/8/16/32Meg	6/19/49/89
Deskpro 2000, 4000, MMX	16/32/64/128Meg	29/49/99/199
Deskpro 6000	16/32/64/128Meg	34/59/109/229
Deskpro 5/60M 5/66M, XE560 (quads)	4/8/16/32Meg	14/29/59/98
Deskpro XL 6150, 6200 (ECC, pairs)	8/16/32/64/128Meg	Call
Presario 510, 520, 524, 660, 720, 724, 860	4/8/16/32Meg	6/19/49/89
Presario 920, 924, 954, 974 978, 992	4/8/16/32Meg	6/19/49/89
Presario 2100, 2120, 2200, 3020, 3060 (EDD pairs)	4/8/16/32Meg	6/19/49/89
Presario 4112, 4122, 4160, 4402 (EDO pairs)	4/8/16/32Meg	6/19/49/89
Presario 4504, 4508, 4528 (SDRAM)	16/32Meg	34/69
Presario 4704 4706, 4710, 4712, 4714 4716 (EDD pairs)	4/8/16/32Meg	6/19/49/89
Presario 4764, 4779, 4784, 4786 (SDRAM)	16/32Meg	34/69
Presario 4808, 4814 (SDRAM)	16/32Meg	34/69
Presario 7179, 7180, 9536, 9546, 9548, 9564 (pairs)	4/8/16/32Meg	6/19/49/89
Presario 9232, 9234, 9240, 9250, 9642, 9660 (pairs)	4/8/16/32Meg	6/19/49/89
Proliant 1000 5/60, 2000, R, 4000, R (quads)	4/8/16/32Meg	14/29/59/98
Proliant 1500, 1500R (pairs)	4/8/16/32Meg	14/29/59/98
Proliant 4500, 4500R (quads)	4/8/16/32/64Meg	9/29/44/69/129
Proliant 5000, 5000R (pairs)	32/64/128/256Meg	Call
Prolinea 575, 590, 5100, 5120, 5133 (pairs)	4/8/16/32Meg	6/19/49/89
Prolinea 5100, 5120, 5133, 5150, 5166 (EDD pairs)	4/8/16/32Meg	6/19/49/89
Prolinea 575E, 100E, 120E, 575MX (pairs)	4/8/16/32Meg	6/19/49/89
Prolinea 590MX, 5120MX (pairs)	4/8/16/32Meg	6/19/49/89
Prolinea 6150E, 6180E (pairs)	8/16/32Meg	29/49/89
Prosignia 300 5/75, 5/90, 5/120, 5/150 (pairs)	4/8/16/32Meg	14/29/59/98
Prosignia 500 5/90, 5/120, 5/150 (pairs)	4/8/16/32Meg	14/29/59/98

COMPAQ NOTEBOOK/LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH/Li-on
Armada 1100, 1119, 1120T, 1129, 1125	8/16/32/64Meg	24/44/79/139	104/—
Armada 1130, 1130T	8/16/32/64Meg	24/44/79/139	104/—
Armada All 1500 Series	8/16/32/64Meg	24/44/79/139	139/229
Armada1700, 3500, 7400	16/32/64/128Meg	39/79/149/519	—/219
Armada 4100, 41100, 4120T, 41259 (Kit)	8/16/32/64/128Meg Kit	29/49/99/139/279	—/219
Armada 4130T 4131T, 4150, 4160T (Kit)	8/16/32/64/128Meg Kit	29/49/99/139/279	
Armada 4219T, 4220T (Kit)	8/16/32/64/128Meg	29/49/99/139/279	
Armada 6500	32/64/128Meg	79/139/519	
Armada 7300, 7330, 7350, 7360, 7362, 7379, 7380, 7800	16/32/64Meg	44/79/139	—/231
Armada All 7700 Series	16/32/64Meg	44/79/139	—/229
Armada S8 Series 5200, 5231, 5233, 5266	16/32/64Meg	44/79/139	
Armada S8 Series 6233/12T	16/32/64/128Meg	39/79/149/519	
Contura 4/25, 4/25C, 4/25CX	4/8/16Meg	31/44/79	119/—
Contura 400C, 400CX, 410C, 410CX	4/8/16Meg	5/44/74	104/—
Contura 42DC 420CX, 43DC, 43DCX	4/8/16/24Meg	31/44/74/89	104/—
LTE 5000, 5100, 5200, 5300, 5400 (Kit)	8/16/32/64Meg Kit	3/10/49/119/229	138/259
Presario 1000, 1919, 1020, 1930, 1070, 1080	8/16/32Meg	19/54/109	110/217
Presario All 1200, 1600, 1800 Series	16/32/64Meg	39/79/139	112/236

TOSHIBA NOTEBOOK MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH/Li-on
Libretto 50CT, 70CT, **100CT**	8/16/32Meg	39/59/89	—/161
Tecra 500CDT CS, 510CDS, CDT, 520CDT, 530CDT	8/16/32/48/64/128Meg	22/44/79/119/139/289	231/239
Tecra 540, 550, 550CDT	8/16/32/64/128Meg	22/44/79/139/289	259—
Tecra 700CS, 700CT (SDRAM)	8/16/32Meg	59/89/149	279/259
Tecra 710CDT, 720CDT, 730CDT, 730XCDT, 740CDT	8/16/32/64/128Meg	39/49/89/149/289	279/259
Tecra 750CDT, CDM,DVD, 780 Series	8/16/32/64Meg	22/44/79/139	
Tecra 8000 Series	32/64/128Meg	79/149/539	
T2100 Series	4/8/16/24Meg	4/29/49/79	104/—
T1900, T4500, T4600, T4700 T4900 All Models	4/8/16/32Meg	33/49/69/119	104/—
T4400, T6400, T6600	16Meg	99	
Satellite T100CS, 105CS, 110CS, 110CT, 115CS	8/16/32Meg	39/59/89	104/—
Satellite 200CDS, 205CDS, 210CS, CT Series	8/16/32Meg	39/59/89	104/—
Satellite 220CDS, 225CDS, 230CX	8/16/32/48/64/128Meg	24/44/79/119/139/289	196/200
Satellite 300, 305, 310, 315, 320, 325, 330, 335 Series	8/16/32/64/128Meg	22/44/79/139/289	196/200
Satellite 2505CDS	16/32/64Meg	44/84/149	
Satellite 4009 Series	32/64/128Meg	79/149/539	
Satellite Pro T400, 405, 410, 415, 420, 425, 430, 435 Series	8/16/32Meg	39/59/89	
Satellite Pro 440CDT, 440CDX, 445, 460CDT	8/16/32/48/64/128Meg	24/44/79/119/139/289	190/200
Satellite Pro 465, 470, 480	8/16/32/48/64/128Meg	24/44/79/119/139/289	196/200
Satellite Pro 490	16/32/64/128Meg	44/79/139/289	
Portege 610CT, 620CT	8/16/32Meg	39/59/89	
Portege 650CT, 660CT	16/32/64Meg	59/89/169	—/210
Portege 7000, 7010	64/128Meg	149/539	

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Kingmax ZV-Mpeg	129.00
Kingmax Video Conference	299.00
Calluna Tech Type III Hard Drive, 260 Meg	399.00
Calluna Tech Type III Hard Drive, 520 Meg	599.00
PCMCIA Card Reader (Internal)	119.00
PCMCIA Card Reader (External)	119.00
CD Rom Kit (Card, Drive, Cables) 20X	299.00
DVD Rom Drive Kit (External)	799.00

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MEMORY PRICE	BATTERY NimH/Li-on
ACER Extensa 336/367/366/368	16/32/64Meg	49/89/149	
ACER Extensa 390, 391, 392, 393, 394, 395	16/32/64Meg	49/89/149	
ACERNote 763, 765, 782, 784, 786	4/8/16Meg	19/29/49	
ACERNote Light 356, 358, 359, 361 (pairs) edo	4/8/16Meg	19/29/64 ea	147/—
ACERNote Nuovo 971, 972, 372, 373, 374	8/16/32Meg	29/49/79	
ACERNote Pro 950, 954, 955, 957, 959 (pairs)	4/8/16Meg	19/29/64 ea	
ACER Travelmate		Call	
AST Ascentia A Series and M Series	8/16/32/64Meg	29/49/78/139	154/219
AST Ascentia P30, P50	8/16/32Meg	49/69/109	—/299
AST Ascentia J10, J30,J50 (pairs)	4/8/16/20Meg	19/29/69/89 ea	—/160
AST Ascentia 800N, 810N, 900N, 910N	4/8/16Meg	46/58/79	105, 147/107
AST Ascentia 950N	8/16Meg	59/79	—/187
AST Ascentia M5230 J/M 5260X	16/32/64Meg	49/89/149	
AT&T Globalyst 130	4/8/16Meg	19/29/69	103/—
Canon Innova Book 350CD, 360, 475 (pairs)	8/16Meg	29/69 ea	119/—
Canon Innova Book 480, 490 EDD (pairs)	8/16Meg	29/69 ea	119/—
CTX EZ Book 300 EDD (pairs)	8/16/32Meg	39/69/109 ea	138/—
CTX EZ Book 500, 600 Series	4/8/16Meg	19/29/69	138/—
CTX EZ Book 700, 760, 770 (EDD) (pairs)	4/8/16/32Meg	19/29/69/109 ea	138/—
CTX EZ Book 760MT, 765MT (EDO) (pairs)	8/16/32Meg	29/59/109 ea	138/—
DEC HiNote Ultra 2000	16/32/64Meg	49/79/139	
DEC HiNote VP 520,525,535,545/150MMX (pairs)	4/8/16Meg	19/29/69 ea	119/269
DEC HiNote VP 5100, 5120	8/16/32/64Meg	29/49/79/149	119/—
DEC HiNote VP, CSS, LSS, CTS, LTS	8/16/32/64Meg	29/49/79/149	119/—
DEC HiNote VP700, 703	16/32/64Meg	49/79/149	
Dell Inspiron 3000, 3200, 7000	16/32/64Meg	49/79/139	—/229
Dell Latitude CP & CPi Series	16/32/64Meg	49/89/149	
Dell Lattitude LM, LM P166MMX (pairs)	4/8/16/32Meg	19/29/69/109 ea	—/245
Dell Lattitude 433, C, CX	4/16Meg	49/79	119/—
Dell Latitude LX, M	4/8/16Meg	49/59/89	105/—
Dell Latitude XP, XPI, XPI CD M166ST (pairs)	4/8/16/32Meg	19/29/69/109 ea	
Epson ActionNote 650, 650c, 660c, 660cx	4/8/16Meg	9/59/89	119/—
Epson ActionNote 880, 866c, 890, 910	4/8/16/20Meg	19/29/69/99	119/—
Fujitsu Lifebook 400, 500, 600 Series	8/16/32/64Meg	29/59/79/149	103/203
Fujitsu Lifebook 500, 600, 700, 900 Series	16/32/64Meg	49/79/139	103/203
Fujitsu Monte Carlo, Montego, Milan	8/16/32/64Meg	29/49/79/149	—/203
Gateway 2000 Colorbook 4/33	4/16Meg	69/179	112/—
Gateway 2000 Solo Series (pairs)	4/8/16Meg	19/29/69 ea	
Gateway Solo Series 2100, 2200 edo	8/16/32Meg	49/79/179	—/219
Gateway Solo 2300, 2500, 3100, 5100, 9100	16/32/64Meg	49/79/139	
Hitachi C-Series	8/16/32Meg	29/44/99	
Hitachi E-Series, MMX Series	8/16/32Meg	49/69/129	119/219
Hitachi M-Series	8/16/32Meg	49/69/129	104/—
Hitachi Visionbook Elite, Plus, Pro	8/16/32/64Meg	29/49/79/149	154/217
HP Omnibook 800	8/16/32/64Meg	49/79/129/169	—/145
HP Omnibook 2100 PII, 4100	32/64/128Meg	89/169/299	
HP Omnibook 4000C, CT, C	4/8/16Meg	49/54/79	126/—
HP Omnibook 5000CT, CTS, C, 5500CS	8/16/32Meg	54/79/129	126/—
Micron Go Book 233 Lite, 233, 266	16/32/64Meg	49/89/169	
Micron MilleniaTransport Pentium (pairs), MRX	8/16Meg	29/69 ea	
Micron MillenaTransport VLX P133 (pairs)	4/8/16Meg	19/29/69 ea	
Micron MillenaTransport XKE P166MMX	16/32/64Meg	49/79/149	
Midwest Micro Elite or Soundbook Plus or Sndbk II, IIP	4/8/16Meg	59/69/129	119/—
Midwest Micro Elite or Soundbook C9	4/8/16Meg	19/29/69	
NEC Ready Notebook 220T, 330T	16/32/64/128Meg	49/89/169/299	133/—
NEC Ultralite Versa, E, V, MP	4/8/16/32Meg	9/44/79/129	133/—
NEC Versa 2600 Series (pairs)	4/8/16Meg	19/29/69 ea	
NEC Versa 4000, 4050/4080, 4200, 4239	4/8/16/20Meg	39/49/79/139	—/219
NEC Versa 6000, 6050, 603D	8/16/32/64Meg	39/79/99/159	
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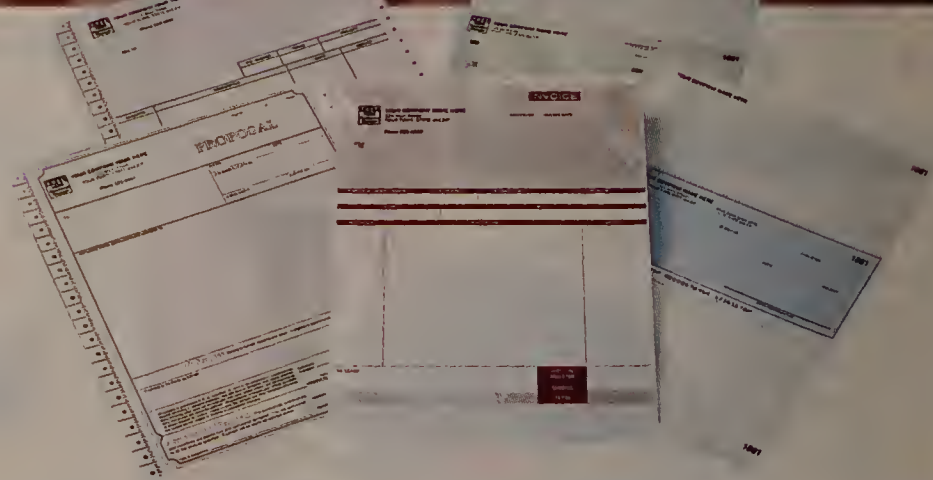

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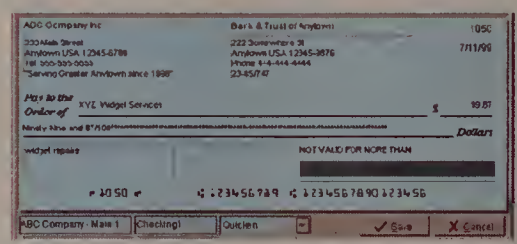

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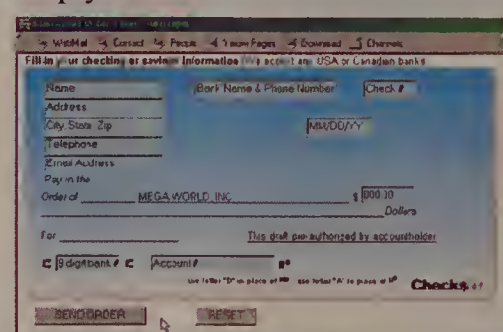

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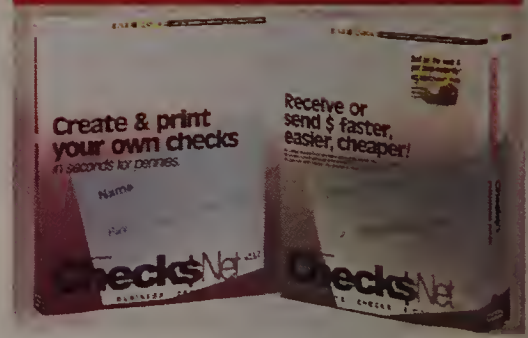

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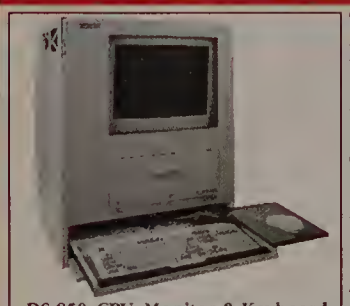

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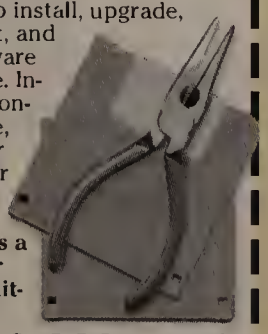

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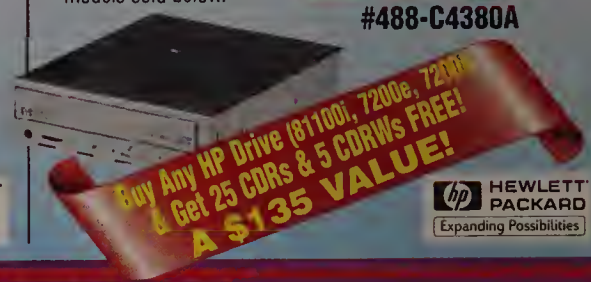

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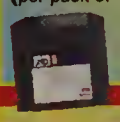

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61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520

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PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660
661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680
681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700
701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740
741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760
761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780
781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800
801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820
821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840
841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860
861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880
881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900

PRODUCT CATEGORY INFORMATION

For information on all of the products mentioned in an article or an entire category of advertised products, circle the appropriate number below.

Editorial Features (see article for numbers)

901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920

Advertised Products

951	Desktop computers	956	Graphics software	961	Mail order companies
952	Notebook computers	957	Network/sharing products	962	Storage devices
953	Windows software	958	Printers	963	Web products/services
954	Monitors and video boards	959	Multimedia products		
955	Accounting software	960	Utilities		

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Advertiser Index A-Z

Get more information–circle the product info number on the reader service card.

Product info number		Page
-	3COM Connected	244
-	3COM/Palm	18
2	Acer Peripherals America	216
-	ACS Innovations	39
12	AMS Tech	225
-	Anthro Corporation	24
45	APC	81
45	APC	99
-	ATI	28
-	ATI	34
-	Barnes & Noble	266-267
91	Caere	263
-	Canon Computer Systems	2-3
41	CDW Computer Centers, Inc.	63
47	CDW Computer Centers, Inc.	85
46	CDW Computer Centers, Inc.	86-87
44	CDW Computer Centers, Inc.	288-289
-	CNN.com	269
-	Compaq Computer Corporation	113
-	Compaq Computer Corporation	119
-	Compaq Consumer	198-199
-	Compaq Consumer	200-201
-	Compaq Direct Plus	276-277
-	Compaq Direct Plus	C2-P1
50	Crucial Technology	10-11
67	CrystalGraphics	65
77	CTX	117
-	Cybermax Computer, Inc.	95-98
-	Cybermax Computer, Inc.	115
-	Dell Computer Corporation	153-154
-	Dell Computer Corporation	155-161
-	Dell Computer Corporation	C5-C8
-	Digital Concepts	26
88	Encanto Networks Inc.	211
-	Epson America	71
84	Executive Software	265
87	EZENET	206
-	Gateway	64A-F
-	Hewlett Packard	36
97	Hughes Network	320-321
-	IBM Corp	55
-	IBM Corp	57
-	IBM Corp	59
-	IBM Corp	61
-	IDG Books	281
108	Iiyama North America	91
116	IKEA	283
119	Imation Corporation	75
98	In Focus	73
-	Iomega Corporation	89
136	Keystone Learning Systems	254
133	Kingston Technology	273
-	Lernout & Hauspie	101
96	LG Electronics USA Inc.	66
148	Lightware	144
-	Matrox Graphic Inc.	22
164	McAfee Software	237
231	Micro Warehouse	292-293
155	Micron Electronics	9
160	Micron Electronics	134
-	Micron Electronics	135-136
142	Micron Electronics	137
161	Micron Electronics	138-139
149	Micron Electronics	140-141
168	Micron Electronics	142-143
-	Microsoft Corporation	20-21
-	Microsoft Corporation	46-47
159	Microsolutions	256
-	Microtek Lab	275
154	Microworkz	42-43
169	Microworkz	82-83
169	Microworkz	130-131
153	Midwest Micro	257-259
57	MindSpring	27
150	Minolta	227
144	Mitsubishi Electronics America, Inc.	133
203	NEC Technologies	25
-	Net Limited	214
205	NetObjects	209
-	NRI Schools/ McGraw Hill	33
216	NVidia	232-233
-	Office Depot, Inc.	181-192
154	Onsale.com	205
195	PC America	285
-	PC Expo	271
66	PC MALL	290-291
198	PlusOne Technologies Corp.	252
191	PowerQuest	151
197	QMS	93
-	Quantex Microsystems, Inc.	121-126
201	Ramp Networks	213
190	Robert Half International Inc.	38
222	SGI.COM/GO/ VISUAL	12-13
223	SGI.COM/GO/ VISUAL	15
-	Sony Electronics Corp.	68-69
-	Sony Electronics	77
-	Sony VAIO Direct	168-169
-	Sony ITA Direct	171-178
-	SPSS	103
220	Tellan	215
229	Tiger Direct	322-323
-	Toshiba America	16-17
230	Umax Technologies	31
248	Vega Technologies	32
-	Viewsonic	4-5
255	Visioneer	203
-	Wal-Mart Store	40
254	WinBook	105
-	Xircom	44

Advertiser Index by Product Category

Get more information–circle the product info number on the reader service card.

HARDWARE

Boards/Cards/Chips

Product info number		Page
-	ATI	28
-	ATI	34
50	Crucial Technology	10-11
-	Digital Concepts	26
133	Kingston Technology	273
-	Matrox Graphic Inc.	22
216	NVidia	232-233
-	Xircom	44

Communications/Fax/Modems

Product info number		Page
-	3COM Connected	244
-	ACS Innovations	39
-	Quantex Microsystems, Inc.	121-126
201	Ramp Networks	213

Computers

Product info number		Page
41	CDW Computer Centers, Inc.	63
-	Compaq Consumer	198-199
-	Compaq Consumer	200-201
-	Compaq Direct Plus	276-277
-	Compaq Direct Plus	C2-P1
-	Cybermax Computer, Inc.	95-98
-	Cybermax Computer, Inc.	115
-	Dell Computer Corporation	153-154
-	Dell Computer Corporation	155-161
-	Dell Computer Corporation	C5-C8
-	Gateway	64A-F
-	IBM Corp	55
-	IBM Corp	57
-	IBM Corp	59
-	IBM Corp	61
231	Micro Warehouse	292-293
155	Micron Electronics	9
160	Micron Electronics	134
-	Micron Electronics	135-136
142	Micron Electronics	137
161	Micron Electronics	138-139
149	Micron Electronics	140-141
168	Micron Electronics	142-143
154	Microworkz	42-43
169	Microworkz	82-83
169	Microworkz	130-131
153	Midwest Micro	257-259
66	PC MALL	290-291
-	Quantex Microsystems, Inc.	121-126
223	SGI.COM/GO/VISUAL	15
222	SGI.COM/GO/VISUAL	12-13
-	Sony ITA Direct	171-178
-	Sony VAIO Direct	168-169
229	Tiger Direct	322-323
248	Vega Technologies	32

Hand Held Devices

Product info number		Page
-	3COM/Palm	18

Laptop/Notebook

Product info number		Page
12	AMS Tech	225
-	Compaq Computer Corporation	119
-	Compaq Consumer	198-199
-	Compaq Consumer	200-201
-	Gateway	64A-F
-	IBM Corp	55
-	IBM Corp	57
-	IBM Corp	59
-	IBM Corp	61
231	Micro Warehouse	292-293
-	Micron Electronics	135-136
-	Sony VAIO Direct	168-169
-	Toshiba America	16-17
230	Umax Technologies	31
254	WinBook	105

Local Area Networks

Product info number		Page
97	Hughes Network	320-321

Monitors/Displays

Product info number		Page
2	Acer Peripherals America	216
77	CTX	117
108	Iiyama North America	91
144	Mitsubishi Electronics America	133
203	NEC Technologies	25
198	PlusOne Technologies Corp.	252
-	Viewsonic	4-5

Multimedia

Product info number		Page
-	Epson America	71
148	Lightware	144
-	Sony Electronics	77

Other

Product info number		Page
-	Compaq Computer Corporation	113
98	In Focus	73
96	LG Electronics USA Inc.	66

Peripherals/Sharing Devices

Product info number		Page
-	Hewlett Packard	36
248	Vega Technologies	32
-	Xircom	44

Power/Protection

Product info number		Page
45	APC	81
45	APC	99

Printers/Plotters

Product info number		Page
-	Canon Computer Systems	2-3
150	Minolta	227
197	QMS	93
-	Wal-Mart Store	40

Scanners/Digitizers

Product info number		Page
-	Microtek Lab	275
255	Visioneer	203

Server Machines

Product info number		Page
88	Encanto Networks Inc.	211

Storage/Backup Devices

Product info number		Page
119	Imation Corporation	75
-	Iomega Corporation	89
159	Microsolutions	256
-	Sony Electronics Corp.	68-69

SOFTWARE

Database Management

Product info number		Page
87	EZENET	206

Graphics

Product info number		Page
67	CrystalGraphics	65

Management

Product info number		Page
195	PC America	285

Optical Character Recognition

Product info number		Page
91	Caere	263

Other

Product info number		Page
-	Lernout & Hauspie	101

Presentation Graphics

Product info number		Page
148	Lightware	144

Software Suites

Product info number		Page
-	Microsoft Corporation	20-21

Statistics

Product info number		Page
-	SPSS	103

Utilities

Product info number — Page

84 Executive Software 265
164 McAfee Software 237
191 PowerQuest 151

Video
136 Keystone Learning Systems 254

Web Authoring Tools
87 EZENET 206
205 NetObjects 209

MISCELLANEOUS

Books/Periodicals/Subscriptions
- Barnes & Noble 266-267
- IDG Books 281

Furniture
- Anthro Corporation 24

Internet Services
- Microsoft Corporation 46-47
57 MindSpring 27
- Net Limited 214
154 Onsale.com 205

Mail Order
41 CDW Computer Centers, Inc. 63
47 CDW Computer Centers, Inc. 85
46 CDW Computer Centers, Inc. 86-87
44 CDW Computer Centers, Inc. 288-289
153 Midwest Micro 257-259
- NRI Schools/McGraw Hill 33
66 PC MALL 290-291
229 Tiger Direct 322-323

Online Services
- CNN.com 269
154 Onsale.com 205

Other
- Office Depot, Inc. 181-192
190 Robert Half International Inc. 38
220 Tellan 215

Retail/Distributors
- Barnes & Noble 266-267
116 IKEA 283

Supplies
- Wal-Mart Store 40

Trade Shows
- PC Expo 271

Training
136 Keystone Learning Systems 254
- NRI Schools/McGraw Hill 33

Antivirus Software
610 McAfee VirusScan 4.0, Network Associates 272

Products Featured in Editorial

Get more information—circle the product info number on the reader service card.

611 Norton AntiVirus 5.0, Symantec 272

Audio
713 Model 88, Cambridge Soundworks 100

Backup/Storage
705 Iomega Clik Drives 88
704 NTI Backup Now, NewTech Infosystems 88

Chair
688 BodyBilt Task Series chairs 41

Checks
608 Quicken- or Money-compatible checks, PC Checks & Supplies 270
609 Quicken- or Money-compatible checks, Sensible Solutions 270

Desktop Computers
641 Acma ZPower 6400 PII-400 228
655 Acma ZPower 7450 PII-450 220
654 Axis Systems Metropolis GX7-S PII-400 220
687 Axis Systems Metropolis NX5-333C 228
631 Axis Systems Orion 100C DVD 228
657 Axis Systems Orion 100V DVD 450 220
659 Compaq Deskpro EP 6450 220
619 Compaq Presario 2266 242
616 Compaq Presario 5600 242
643 Compaq Prosignia Desktop 310 228
633 Compaq Prosignia Desktop 330 228
642 CompUSA American Pro 366 228
652 CompUSA American Pro 500 220
617 CyberMax Enthusiast KII-350 242
632 CyberMax Enthusiast KII-400R 228
735 CyberMax Enthusiast KIII 400 54
- Dell Dimension V350 228
- Dell Dimension XPS R450 220
- Dell Dimension XPS T500 ..... 54, 220, 242
- Dell OptiPlex GX1 400 228
- Dell OptiPlex GX1p 450 220
637 Gateway E-3200 450 228
649 Gateway E-4200 450 220
733 Gateway E-4200 450 54
646 Gateway E-4200 500 ..... 54, 220
614 Gateway G6-500 242
629 Gateway GP6-400 228
658 HP Brio 8500 PII-450 220
660 HP Vectra VL Series 8 HE 220
- IBM PC 300 PL 220
651 IDot.com Entrepreneur 4 220
686 IDot.com Family System 2 242
630 Micro Express MicroFlex-450A 228
640 Micro Express MicroFlex-4A 228
620 Micron Millennia 350 242
628 Micron Millennia 450 Max 228
613 Micron Millennia 450 Max 242
734 Micron Millennia 450 Max 54
645 Micron Millennia 500 Max 54, 220
639 Micron Millennia C366 228
638 MidWest Micro Office Pro 350 228
648 MidWest Micro WKP-450 220
653 NEC PowerMate 8100 220
644 Polywell Poly 8450 B5 228
618 Quantex QP6/333 M-1c 242
634 Quantex QP6/400 M-4x SE 228
647 Quantex QP6/450 SB-4 220
650 Quantex QP6/450 SM-4x 220
615 Sony PCV-E308DS 242
656 Sys Performance Pro 450 220
635 Sys TaskMaster 366C 228
636 Xi Computer 333A Mtower 228

Desktop Publishing
703 Complete Publisher '99, Sierra 84
706 Jazba, Techlogix 90

Document Manager
710 PageKeeper Pro 3.0, Caere 92

Eye Glasses
690 Prio Computer Eyewear 41

Graphics Boards
720 ATI Rage Fury 80
692 Creative Labs 3D Blaster Banshee 253
695 Diamond Monster Fusion 253
700 Elsa Victory II 253
699 Hercules Terminator Beast 253
694 Matrox Millennium G200 SD PCI 253
697 Matrox Millennium G200 253
696 Metabyte Wicked3D Vengeance 253
701 Number Nine Revolution IV 253
698 STB Velocity 4400 AGP 253
693 STB Velocity 4400 PCI 253

Headset
689 PLX-500 Headset, Plantronics 41

Input Device
707 WebRacer, Kensington Technology Group 90

Keyboard Tray
691 Underdesk SuperShelf, Kensington 41

Modems
673 Amquest Host PCI 56K Dual Mode Voice/Speakerphone 255
675 Apache Micro Peripherals NetExpress 56K 255
676 Diamond Multimedia SupraExpress 56e 255
671 Diamond Multimedia SupraExpress 56i 255
678 Digicom Systems Modem Blaster Flash 56 II External 255
674 Digicom Systems Modem Blaster Flash 56 PCI 255
- IBM 56K Modem Internet Kit 255
677 NewCom V.90 56K External Data/Fax Modem 255
672 Viking V.90 56K ISA Modem 255
670 Zoom FaxModem 56K PCI Dualmode 255

Monitors
665 AcerView 79g 251
708 Compaq TFT8000 92
- Dell UltraScan 1000HS 251
709 Digital Flat Panel Solution Pack, SGI 92
- IBM P72 251
664 Iiyama VisionMaster Pro 400 251
667 Mitsubishi DiamondScan 70M 251
668 NEC MultiSync E750 251
663 Optiquest V73 251
661 Samsung SyncMaster 700p plus 251
666 Shamrock C709MU 251
662 ViewSonic PT775 251

Notebook Computers
685 AMS Tech Roadster 15CTA 238
- Dell Inspiron 3500 C300XT 238
- Dell Inspiron 7000 A366LT 238
- Dell Latitude CPi A366XT 79
- Dell Latitude CPi D300XT 238
682 Gateway Solo 2500SE 238
679 Gateway Solo 5150LS 238
684 NEC Versa Note 238
680 NEC Versa SX 238
683 Toshiba Satellite 4015CDS 238
681 Toshiba Tecra 8000 238
722 WinBook XL 300 TFT 80

Office Suites
736 Microsoft Office 2000 120
702 Microsoft Works Suite 99 84

Postage Metering Kits
711 Simply Postage, Neopost 94
712 Stamps.com 94

Printers
624 Canon BJC-4400 245
621 Canon BJC-5000 245
- Epson Stylus Color 1520 245
- Epson Stylus Color 440 245
- Epson Stylus Photo 700 245
719 HP DeskJet 882C 78
622 Lexmark 3200 Color Jetprinter 245
623 Lexmark 5700 Color Jetprinter 245
626 Lexmark Optra SC 1275 245
714 Sony FVP-1 Mavica Photo Printer 100
627 Tally T8104 245
625 Tektronix Phaser 740/N 245

Projectors
715 CTX Opto EzPro 585 104
716 InFocus LP400 104
717 Proxima UltraLight LS1 104
718 Sony VPL-SC50U 104

Scanners
728 Acer AcerScan Prisa 620U 164
730 Agfa DuoScan T1200 164
- Epson Perfection 636 164
729 HP ScanJet 4100C 164
724 HP ScanJet 6200C 164
725 Microtek ScanMaker X6 164
727 Pacific Image ScanAce 1236P 164
726 Plustek OpticPro 9636T 164
723 Umax Astra 2400S 164
731 Visioneer 6100B 164

Upgrade Cards
601 ATA Pro Flash BIOS upgrade card, Micro Firmware 284
602 Flash BIOS upgrade card, Unicore Software 284
604 ZppA BIOS upgrade card, BlueSky Innovations 284

USB Converter Kits
606 USB PCI adapter card, USB-to-parallel printer kit, USB-to-serial converter kit, Belkin Components 38
607 USB PCI adapter card, USB-to-parallel printer kit, USB-to-serial converter kit, Entrega Technologies 38

Utilities
603 Norton Utilities 4.0 for Windows 95/98, Symantec 284
612 Quick View Plus 5.0, Jasc Software 272

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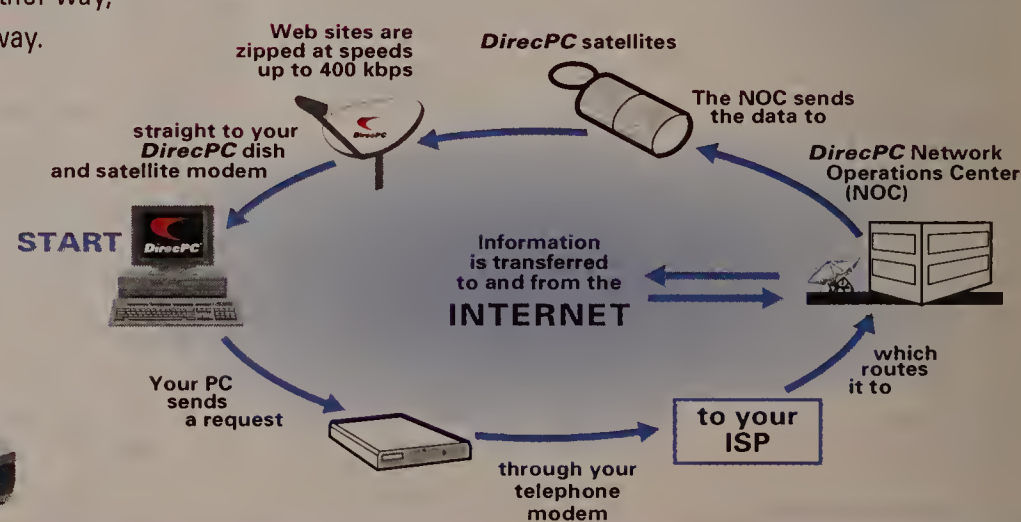
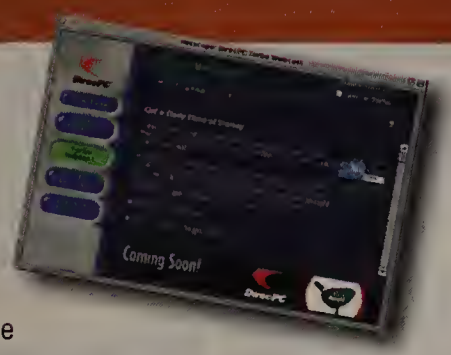


waiting?"



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On-Line Time (Hours of usage for Turbo Internet)	25 Hours /Month	100 Hours/Month	200 Hours/Month
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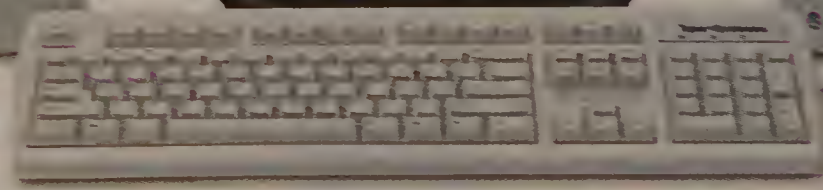

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AMD K6-2	380MHz	96MB	6.4GB	$1029.99	CTNTM38
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573 Pre-Assembled Kits: Motherboard in midtower case, keyboard, mouse, 1.44MB floppy drive, and 24X CD-ROM. Sound onboard.

Tiger 571 Form Factor: **AT** • CPU: **Socket 7** • Bus Speed: **Up to 83 MHz** • On Board Video: **PCI 4MB** • On Board Audio: **YES** • PCI Slots: **4** • ISA Slots: **3** • Memory: **2DIMM/4SIMM** • Max Memory: **128/256 MB**
Tiger 573 Form Factor: **AT** • CPU: **Socket 7** • Bus Speed: **Up to 75MHz** • On Board Video: **No** • On Board Audio: **YES** • PCI Slots: **4** • ISA Slots: **2** • Memory: **2DIMM/4SIMM** • Max Memory: **128/256 MB**

Tiger 6KE LX, 6BE+ BX AGP Slot 1

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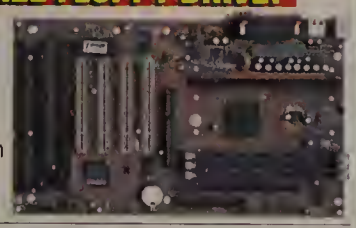

Retail Motherboard : Motherboard cables & manual
Motherboard & Case: ready to assemble! Includes motherboard in dual-cooling fan case; 235 Watt power supply, cables & manual

Tiger 6KE LX Motherboard Features At-A-Glance
Form Factor: **ATX** • CPU: **Slot 1** • Bus Speed: **Up to 66 MHz** • PCI Slots: **4** • ISA Slots: **3** • Memory: **3 DIMM Sockets** • Max Memory: **384 MB**

Tiger 6BE+ BX Motherboard Features At-A-Glance
Form Factor: **ATX** • CPU: **Slot 1** • Bus Speed: **Up to 100MHz** • PCI Slots: **4** • ISA Slots: **3** • Memory: **3 DIMM Sockets** • Max Memory: **768 MB**

Tiger SY-5EMA ATX Super Socket 7

Motherboard & Case: Motherboard mounted in dual-cooling fan ATX case with 1MB Cache ; 235-watt power supply, cables, manual
Pre-Assembled Kits: Motherboard in dual-cooling fan case; keyboard, speakers, mouse, 3D AGP video, 56KFlex faxmodem, 1.44MB floppy drive, 24X CD-ROM, Wave Table sound.

Tiger SY-5EMA Motherboard Features At-A-Glance
Form Factor: **ATX** • CPU: **Socket 7** • Bus Speed: **Up to 100 MHz** • AGP Slots: **1** • PCI Slots: **5** • ISA Slots: **2** • Memory: **2DIMM/2 SIMM Sockets** • Max Memory: **512MB**

Tiger 767 AT, 760 ATX Slot 1

Micro ATX Slot 1 with 3 PCI/1 ISA

AT Slot 1 with 4 PCI/1 ISA

Motherboard & Case: Motherboard mounted in dual-cooling fan case; keyboard, cables & manual
Pre-Assembled Kits: Motherboard in dual-cooling fan case; keyboard, speakers, mouse, 3D AGP video, 56KFlex faxmodem, 1.44MB floppy drive, 24X CD-ROM, Wave Table sound.

Tiger 767 Form Factor: **AT** • CPU: **Slot 1** • Bus Speed: **Up to 100 MHz** • On Board Video: **8MB AGP** • On Board Audio: **YES** • PCI Slots: **4** • ISA Slots: **1** • Memory: **DIMM** • Max Memory: **768 MB**
Tiger 760 Form Factor: **Micro AT X** • CPU: **Slot 1** • Bus Speed: **Up to 100MHz** • On Board Video: **8MB AGP** • On Board Audio: **YES** • PCI Slots: **3** • ISA Slots: **1** • Memory: **DIMM** • Max Memory: **768 MB**

MOTHERBOARD SPECIFICATIONS / MOTHERBOARD ONLY / MOTHERBOARD & CASE / PRE-ASSEMBLED KITS

Motherboard Design	Processors Supported	Motherboard Only Item No.	1-2 units	3+ units	Motherboard & Case Item No.	1-2 units	3+ units	Pre-Assembled Kits Item No.	1-2 units	3+ units
Tiger 571 AT including Wave Table sound and PCI video	**AMD** Up to K6-300 & K62-266 **Intel** Pentium up to 233 MMX **IBM/Cyrix** Up to PR300	MB1-C-1B	$75.99	$68.99	BB1-C-1B Mid-tower AT case with 200-Watt power supply	$124.99	$114.99	KT1-C-1B	$214.99	$197.99
Tiger 573 AT including Wave Table sound	**AMD** Up to K6-300 **IBM/Cyrix** Up to PR300; **Intel** Pentium up to 233 MMX	MB1-E-8A	$39.99	$37.99	BB1-E-8A Mid-tower AT case with 200-Watt power supply	$99.99	$89.99	KT1-E-8A	$169.99	$159.99
Tiger SY-5EMA Super Socket 7 1MB Cache	All **AMD** Up to K62-400; **Intel** Pentium up to 233 MMX **IBM/Cyrix** up to MII 350	MB1-T-7A	$59.99	$54.99	BB1-C-2C Unassembled—ATX case with 235-Watt power supply & Free Floppy Drive	$129.99	$114.99	KT1-E-2C	$256.99	$249.99
Tiger 767 AT Slot 1 with Sound & AGP video	**Celeron** up to 333MHz **Intel** Pentium II up to 500MHz	MB1-E-5A	$99.99	$91.99	BB1-E-5A AT Case 200 W Power Supply	$154.99	$142.99	KT1-E-5B	$249.99	$229.99
Tiger 760 Micro-ATX Slot 1 w/Sound & AGP video	**Celeron** up to 333MHz **Intel** Pentium II up to 500MHz	MB1-E-6A	$99.99	$91.99	BB1-E-6A Micro ATX Case 140W Supply	$139.99	$128.99	KT1-E-6A	$239.99	$220.99
Tiger 6KE LX ATX Slot 1	**Celeron** up to 333MHz **Intel** Pentium II up to 333MHz	MB1-T-10A	$46.99	$37.99	BB1-T-10A Unassembled—ATX case with 235-Watt power supply & Free Floppy Drive	$114.99	$99.99	Not Available		
Tiger 6BE+ BX ATX Slot 1	**Celeron** up to 500MHz **Intel** Pentium II up to 500MHz	MB1-T-9A	$84.99	$77.99	BB1-T-9A Unassembled—ATX case with 235-Watt power supply & Free Floppy Drive	$149.99	$139.99	Not Available		

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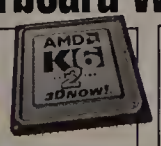

Tiger recommends the Super Socket 7 motherboard with these CPUs

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#CP2-K62-333	333	3DNow!	$89.99	$85.99**
#CP2-K62-350	350	3DNow!	$107.99	$102.99*
#CP2-K62-380	380	3DNow!	$144.99	$137.99**
#CP2-K62-400	400	3DNow!	$164.99	$156.99*
#CP2-K63-400	400	Shark Tooth!	$299.99	$285.99*

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Tiger recommends the AT motherboard or the Tiger Super Socket 7 motherboard with these processors.

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#CP2-6X350	MII 350 CPU	$94.99	$89.99†

Intel Celeron & Pentium II MMX

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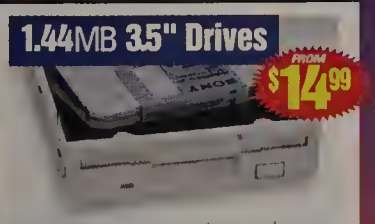

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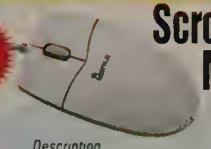

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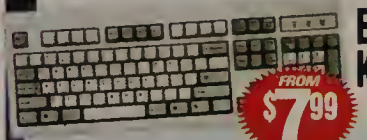

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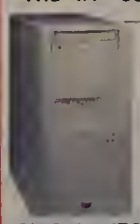

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You Want Fries With That PcG-217-AkIII?

THE WAY I SEE IT, Microsoft has stolen a marketing leaf from McDonald's by offering the equivalent of Extra Value Meals, or maybe Super Sizing. Let's see: The Standard Edition of Office 2000 includes Word, Excel, PowerPoint, and Outlook. The Small Business Edition eliminates PowerPoint but adds Publisher, Small Business Tools and, I think, a large Coke. The Professional Edition brings back PowerPoint and throws in Access and a medium fries for good measure.

Stay with me on this. The Premium Edition adds Front Page, Photo Draw, and three *Prince of Egypt* toys. Finally, the Developer Edition comes with all the above plus programming tools and a movie-size tub of butter-flavor popcorn. Quick, now: Which one's which?

Maybe other industries don't really do this sort of thing better. Maybe we're just used to the way they operate. For instance, there's no inherent reason you should know that a Honda Accord costs more and is bigger than a Civic, but I bet you do. And I bet you're as baffled as I am by computer industry nomenclature. More often than not, you can't use the names and numbers to divine the answers to the most fundamental questions: Which came first? Which is faster? Which is more expensive?

To this day, I have trouble recalling whether my Sony subnotebook is model 505FX or 505GX. It's the former, which, of course, came out after the latter. Good thing Intel didn't start with the Pentium VIII and work back from there.

A major PC maker will soon come out with the Cantaloupe, the Pomegranate, and the $400 Lemon.

AND IT GETS WORSE

NOT THAT INTEL makes things easy. Between desktop and laptop CPUs running at the same speed, there are so many flavors of things named Pentium II and Celeron (with or without the word *mobile* attached), not to mention Pentium III and the unforgettable Xeon, that your eyes glaze over trying to figure out all the subtle differences.

Is the Palm VII the follow-up to some future Palm VI? Nope. It's a forthcoming wireless version of the Palm III. When you click on 'Aptiva E270' on IBM's Web site, why does it return specs for something called 'Model 2158270'?

In this industry, if Apple finally relinquished control of the name FireWire, the prevailing wisdom would be to stick with the snappier IEEE 1394. But that scenario may be about to change. Our sources suggest the following marketing coups may be just over the horizon:

Inchworm inside: Intel is now making it easy to to tell its chips apart by giving them names from the animal kingdom related to speed and portability, with subspecies as modifications. Thus the Intel Slug comes in Sea and Banana versions; the Intel Cat, in Siamese and Domestic Shorthair. To maintain the illusion that the former Celerons deliver inferior performance, they will be named after insects: the Intel Mosquito, the Intel Cockroach, and of course, the populist Intel Beetle.

Paint jobs: Who says Apple's the only company that can compete on colors? A major PC maker will soon come out with the Cantaloupe, the Pomegranate, and the $400 Lemon.

Version versions: No one with an iota of sense would think of buying a 1.0 version of anything. From now on, a consortium of software vendors will use the random number generator built into each Pentium III to number successive releases. Expect to see WordPerfect 17, then 3672.4, then 799 1/3, and version 97546 x 2^{10}.

Beyond Y2K: After the turn of the century, a group of suddenly unemployed COBOL programmers will begin developing numbers to continue the Windows and Office 2000 tradition. Wags suggest 10000 as the first one, in honor of the time it will take until all of Microsoft's V2K (version 2000) bugs are fixed.

Dump the alphabet soup: No more initials! USB will become The Little Wire That Could. EIDE turns into Mr. Zippy. And ISA? The Bus Formerly Known as Standard.

And by the time these plans actually get implemented, computers will be so cheap that McDonald's will probably be doing most of the marketing. Want an Intel Greyhound? There'll be one in every Happy Meal.

PC World *Contributing Editor Stephen Manes has been writing about computers and their frustrations for more than 15 years.* ■

PHOTOGRAPH: ERIK BUTLER

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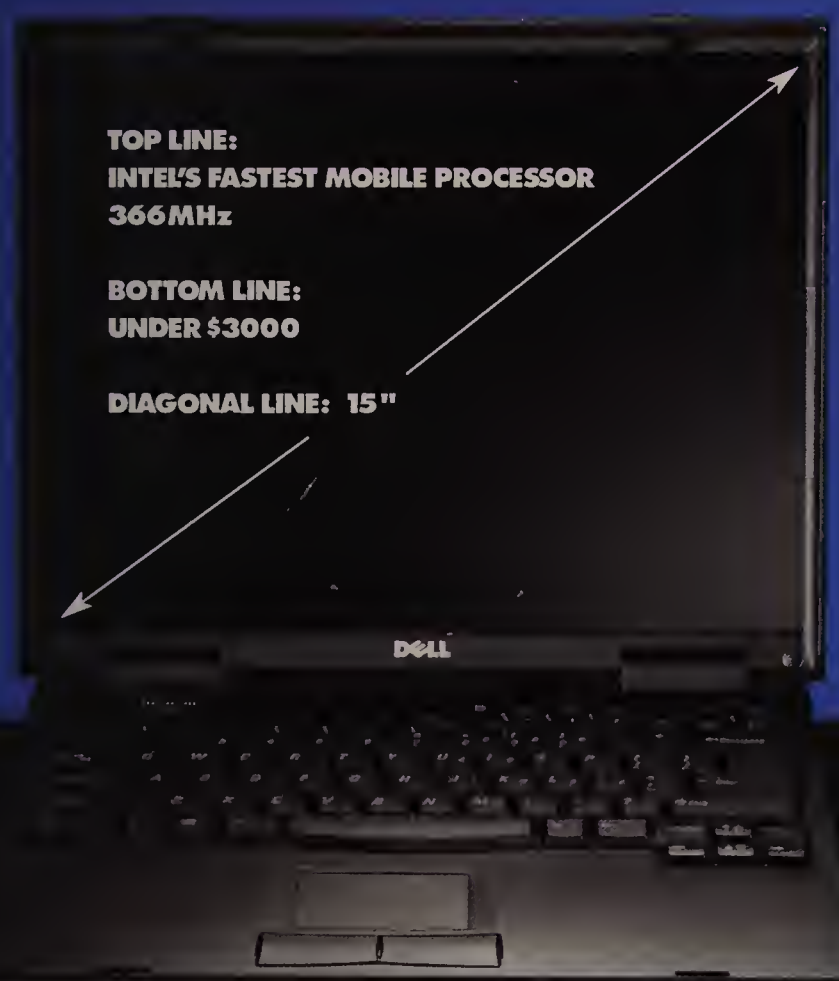

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